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FOOD MANUFACTURE

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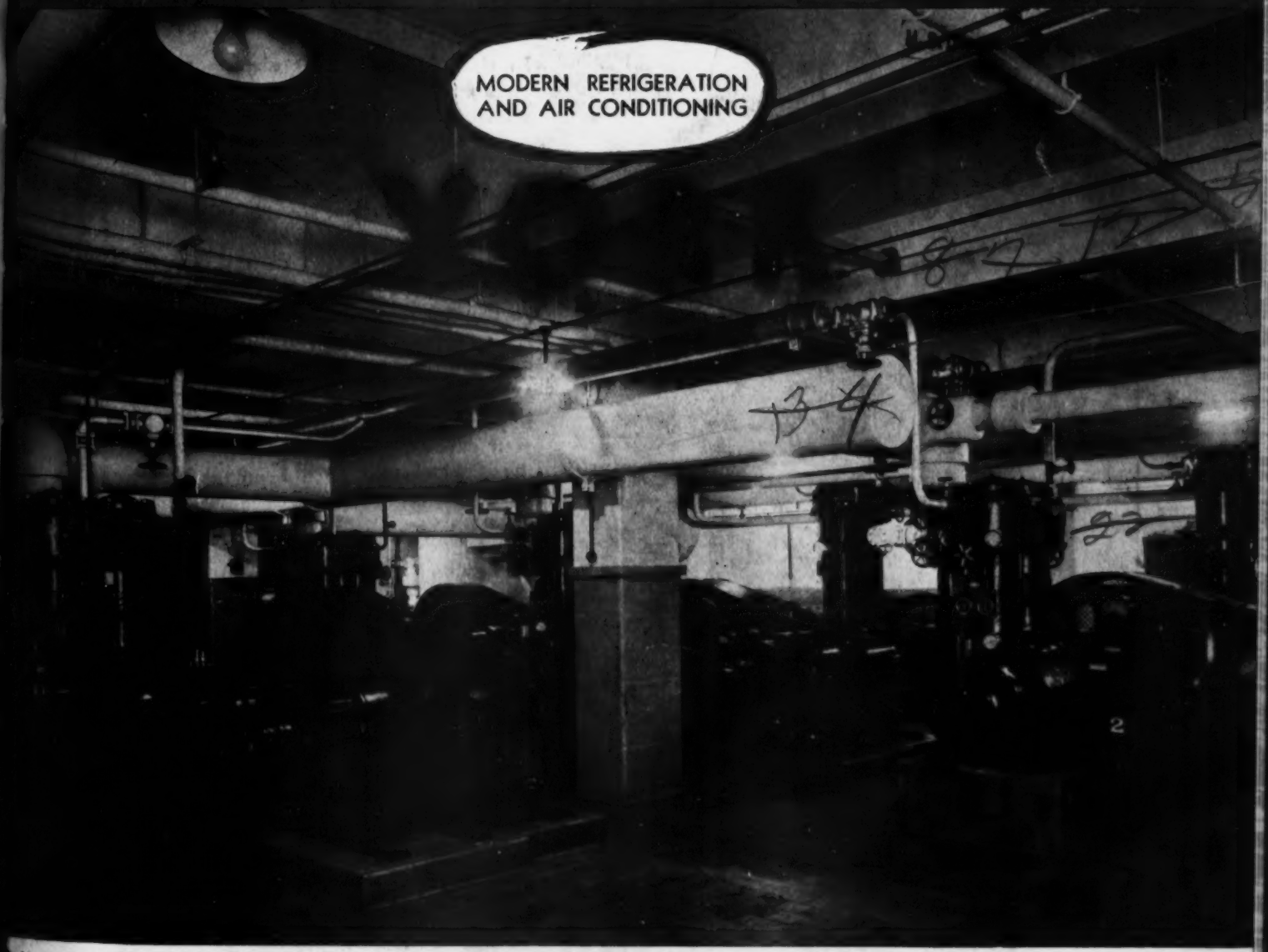

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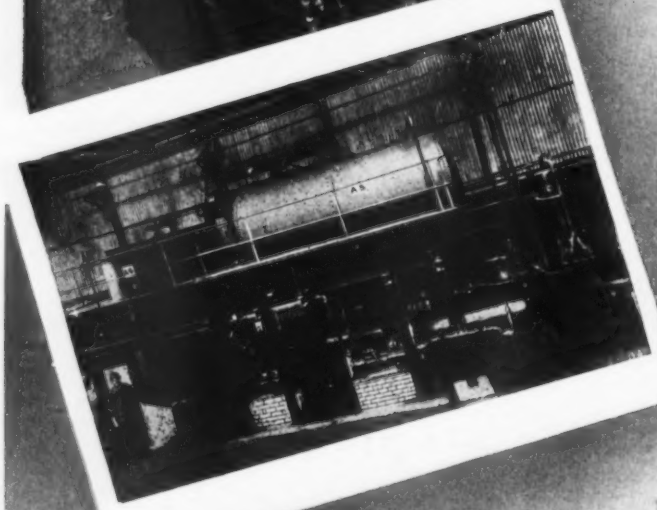

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FOOD MANUFACTURE

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The Editor will be glad to consider contributions from those engaged in the Food Industry. Articles intended for publication should be of a practical nature and accompanied by photographs or drawings when possible.

CONTENTS

	PAGE
Editor's Comments	217
The Birthplace of Bacon	221
Harris of Calne	222
Nitrite in Cured Meats	230
Preservatives in Food *by T. W. Corran, B.Sc., Ph.D.*	232
Flavoured Shakes for Milk Bars *by L. J. Hynes*	235
Economical Milk Cooling	237
Correspondence	237
Around the Industry	238
Storage and Preservation *by Frank Gerrard*	241
British Association of Chemists: President's Garden Party	243
This Month's New Books	244
The Ripening of Meat *by T. Crosbie-Walsh, F.I.C.*	245
Information and Advice	247
Recent Patents	249
New Companies	251
Latest Trade Marks	252

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FOOD MANUFACTURE

Vol. XII, No. 7 July, 1937

Canned Food Propaganda

IN AN advertisement of an hotel at a health resort one of the inducements offered is "fine English cooking—nothing tinned ever served".

It is in combating this sort of propaganda that Miss Janet Bond's Canned Foods Advisory Bureau will, among other things, find its scope. A trained dietitian, Miss Bond will specialise in canned foods of all kinds. The Bureau will have a kitchen, and will comprise a species of clearing house for canned food problems. Attractive new recipes will be constantly evolved.

Not only will the housewife be able to benefit free of charge by the services offered by the Bureau (incidentally, the venture, whilst being an independent body, has received the backing of a leading firm in the industry), but such misguided people as the proprietors of the hotel above mentioned may be made to see the error of their ways. Canned foods are not yet universally accepted as free from some mysterious reproach. We are constantly surprised to hear extraordinary opinions expressed by members of the "intelligentsia" regarding the risks attached to their consumption.

It will be propaganda of the type exercised by Miss Bond's enterprise that will finally dissipate the last tenacious vestiges of prejudice against the modern method of distributing wholesome and safe foods—methods which have been conscientiously and enthusiastically worked out by first-class scientists of many countries and developed by some of our best industrialists, technicians, and business men.

Colonial Empire Marketing Board

In our Editorial Comments for September, 1933, we lamented the decease of the Empire Marketing Board when we said: "Thus after seven years of faithful and useful and not expensive service the greatest of all marketing boards, one that embraced the claims and requirements of the whole Empire, and did so much to educate public opinion as to the resources and potentialities of our colonies, is to be abolished at a time when the Government is indulging in an orgy of creating all sorts of home marketing boards from hops to hens and pigs to potatoes". Just as we mourned the passing of the Empire Marketing Board so now we applaud its resurrection—even though its form be changed. For surely the statement of Mr. Ormsby-Gore on May 6 that: "As a result of the careful examination of the question by an inter-Department Committee, H.M. Government have approved proposals for a scheme to promote the marketing of colonial produce in the United Kingdom and overseas" really means that the old Empire Board is to come into fresh being, even though at first but a shadow of its former self. We welcome this step and hope that the new Colonial Empire Marketing Board, which will cost only about £52,000 a year, may recapture some of the old threads and revive much of the good work done by its ancestor, to the benefit both of colonial producer and home consumer.

Agricultural Policy

The agricultural community which has been waiting anxiously for a pronouncement of the Government's long term policy for agriculture will not have derived a great deal of satisfaction from Mr. Morrison's recent statement. By far the most important sections of agriculture requiring a stable long term policy are milk, pigs, poultry, and meat, and yet the statement carefully ignores them all. The farmers, whose existence depends on these commodities, are left floundering in the chaos created by the Marketing Boards. Instead of grappling with these most urgent needs the Minister of Agriculture concerned himself with unfolding a programme of raising the fertility of the soil by reducing the cost to farmers of lime and basic slag, a very worthy object but one which farmers would solve for themselves if their products had a secure market. There can be little advantage in increasing soil fertility if the crops raised are to be sold below cost. Further, the Minister has once again

bowed the knee to those persistent advocates of increased wheat production by increasing by 2 million quarters the quantity of wheat eligible for the maximum guaranteed price. The quality of English wheat produced this season has not been such as to encourage an increased acreage. Some people may argue that this is a step in the direction of greater food security in times of emergency. In actual fact what does it mean? Instead of having to import 22 million quarters as we did last year, we should only have to import 20 million! Not much use in war time!

More Subsidies

Mr. Morrison, however, went to great pains to expose what he calls the fallacy that agriculture should be placed on a war footing. We agree with this and, therefore, cannot quite understand why he is encouraging more home-grown wheat which is not of such good quality as we can buy cheaper from our Dominions. Surely those more intimately domestic products, such as milk, butter, and eggs should be encouraged because these home products are superior to any we could import. The Minister has further extended the already too extensive grants of subsidies. This time oats and barley are to be subsidised. The time will come, it would appear, when every single agricultural product will be subsidised, thereby producing a very burdensome cost of living which will not be tolerated in the industrial towns. We do agree with the attempt to combat cattle disease—this should have been made years ago, but even this savours to us as half-hearted and timid. £600,000 is all that can be spared to fight disease which costs the country £14,000,000 a year! The framers of the Army and Navy estimates evidently think in a totally different dimension to the Ministry of Agriculture. £600,000 wouldn't go far in the battleship line. Altogether we are sorry to conclude that the new agricultural policy of the Government will do nothing towards immediate improvement and very little towards future permanent benefit. It is weak-kneed and insipid, completely lacking in imagination and only touches a fragment of the fringe of the whole problem.

Eat Sugar and be Sober

According to the *Daily Sketch*, if sweets are consumed prior to going on the binge the reveller will remain sober, or, at any rate, he will not get so drunk as he might otherwise have done. This should be good news for the confectionery trade. The suggestion, we understand, was made by Professors Howard Haggard and Leon Greenberg of Yale University at the opening session of the National Academy of Sciences Conference at Washington. It was based on experiments which, it was alleged, showed that the higher the sugar content of the blood, the less intoxicating (within limits) was alcohol. We can visualise the mahogany of our favourite bar laden with bars of barley sugar and butterscotch instead of the gherkins and biscuits we see there now. We can hear the familiar request for a pint of old and mild, and to our surprise hear the barmaid reply, "Not until you've had your barley sugar, Mr. Stout". There is a lot in the idea. It should do good to both confectionery and brewing trades. The former by creating a demand and the latter by creating a thirst. There may be a snag in it. American beers may not be the same as English, which might recoil in affronted dignity at its juxtaposition with barley sugar or fruit drops, to the complete upset of the partaker's internal mechanism.

The Sugar Agreement

The text of the Agreement, which was signed on May 6 by representatives of 21 countries for the regulation of production and marketing of sugar, has now been published. London has been chosen as the seat of the International Sugar Council and its Executive Committee of nine members. The Council is to meet once a year at least. When he opened the Conference Mr. Ramsay MacDonald said: "It is clear that we cannot devise a general formula applicable to all countries. Our task will be to draw up rules which will apply to each group of countries to deal with the particular part they are playing as producers, exporters and importers in the activities of the complete sugar industry".

The Agreement

As far as it is possible for anyone to judge from the published Report the Conference did its work well. The contracting governments undertake so to work the Agreement as always to assure consumers of an adequate supply of sugar on the world market at a reasonable price which will not exceed the cost of production of efficient producers, allowing, of course, a reasonable profit. It was also decided that, if and when prices on the free market rise, all necessary steps should be taken to prevent the rise in world prices from leading on the one hand to such an increase of internal prices for consumers in non-exporting countries as would be likely to check consumption, and on the other hand to a rise of wholesale prices (beyond the level

required to secure a fair return for growers and producers) to such a point as to stimulate excess production and defeat the object of the Agreement. These are very laudable objects, and if put into complete operation would go far to solve the vexed problem of sugar production, but ideals are one thing and practical politics another. Whether the Agreement will stand the acid tests of glut or shortage only time can show, though we sincerely hope that the scheme will be successfully worked.

Empire Quotas

The United Kingdom Government has undertaken to maintain in operation those provisions of the Sugar Industry (Reorganisation) Act, 1936, designed to limit the annual production of sugar in Great Britain to a standard quantity of 560,000 long tons of white sugar and that the total exports from the British Empire shall be limited to a basic figure of 965,254 metric tons per quota year. Australia's exports are limited to 406,423 and South Africa to 209,000 metric tons. We have never been greatly enamoured of the policy of artificial restriction of natural products. The attempts in the case of wheat were a lamentable failure, and Nature did more in a few months in the way of reducing the accumulated surplus than the Wheat Commission did in years. The same may well happen in the case of sugar. Failure to export a quota or any part of it in any year gives no right to an increased quota the next year and no quota may be ceded from one contracting government to another. Thus if a producing country, which has a quota of 60,000 tons, had a crop failure and could only supply 20,000 tons this year and had a bumper crop next year and produced 100,000 tons, she would be left with 40,000 tons on her hands. When Argentina was in a similar position in regard to wheat she unloaded it in excess of her quota. It may be the same with sugar.

Vitamin A and D Potency of Butter

The actual vitamin potency of butter is a most important subject, and it is surprising that so few biological assays of butter in terms of established units have been published. R. S. Morgan and H. Pritchard, *Analyst*, **62**, 354, describe the technique of the biological assays used for both vitamins and summarise their findings.

The average vitamin A potency of 75 samples of butter has been found to be 22·5 units per gram.

The vitamin D potency has been determined in 39 samples, and the average figure is 0·36 unit per gram.

From a systematic study of samples of known origin and date of production a graph has been produced showing the fluctuation in potency throughout the year. The results obtained show that the lowest vitamin A potency, reached at the end of winter feeding, is 10 to 14 units per gram of butter-fat, and the highest, reached in June to July, is about 30 to 40 units per gram of butter-fat. The lowest vitamin D potency, during winter feeding, is from less than 0·1 to 0·3 unit per gram. During the summer, the values range from about 0·4 to about 1·0 unit per gram of butter-fat.

The average summer butter, in this series, has a potency of 27·2 units per gram of vitamin A and 0·49 unit per gram of vitamin D. The average butter produced in the months from November to April contained 15·4 units of vitamin A per gram and 0·16 unit per gram of vitamin D.

Phrygian *v.* Egyptian

We doubt not our readers are familiar with the noble works of Herodotus, who, approximately 500 B.C., appears to have been a mixture of Marco Polo and our own Samuel Pepys. Writing of his visit to Egypt, even then a land of mystery and eld, Herodotus discusses the arguments between the Phrygians and the Egyptians as to which held pride of antiquity. These are his words: "Now the Egyptians, before the reign of their King Psammetichus, believed themselves to be the most ancient of mankind. Since Psammetichus, however, made an attempt to discover who were actually the primitive race, they have been of opinion that while they surpass all other nations, the Phrygians surpass them in antiquity. The king contrived the following method of discovery: He took two children of the common sort and gave them to a herdsman to bring up, strictly charging him to let no one utter a word in their presence. His object was to know what words they would first articulate. It happened as he anticipated; the herdsman obeyed his orders for two years, then, on his one day opening the door, the children both ran up to him and distinctly said 'Becos'. King Psammetichus himself then heard them say the word, and later established that 'becos' was the Phrygian name for bread. In consideration of this circumstance the Egyptians yielded their claims, and admitted the greater antiquity of the Phrygians. That these were the real facts I learnt at Memphis from the priests of Vulcan."

And we, of course, are in no position to doubt the words of the holy priests of Vulcan, for Herodotus himself doth elsewhere say that it is an

ill thing to doubt either gods or priests, lest retribution follow.

Nitrite

As will be seen by a specially contributed article in this issue, the "nitrite bogey" pops up in the meat canning world with unfailing regularity. The position is ludicrous. The presence of nitrite in meat canning is inferentially prohibited by the Regulations, yet there is no can of cured meat or no rasher of bacon consumed in this country but contains nitrite, and their characteristic colour is unobtainable without the intervention of this salt during manufacture.

British canners do not appear to be worrying unduly. Why should they, when practically all the imported canned meats have been cured with nitrite? If the Regulations are being strictly adhered to there is not a molecule of nitrite used in the meat factories in this country. We wonder!

Vicissitudes

A judge of the King's Bench Division recently gave judgment in a preserved foods case, as reported by our contemporary, *Food Industries Weekly*. Briefly, some preserved prawns were sold by a firm of retailers on November 1, 1935, and were eaten on that day, causing illness to 11 out of 13 customers, due to unsoundness. The retailers paid damages and duly sued their suppliers for indemnity, alleging that the goods could not have been sound at the time of their delivery, which had been from 5 to 9 months previously.

The judge refused to grant the indemnity, and made a statement to the effect that the goods had been stored and would be subject to "the vicissitudes from which all canned and bottled goods necessarily suffered."

This is an idea which, if widely disseminated, would have an unfavourable repercussion in the preserved food trade. Properly prepared, and providing they are sound at the time of manufacture, preserved foods are, for all practical purposes, sterile, and as such any "vicissitudes" short of playing football with them should leave them intact and suitable for consumption. The writer recently sampled rabbit from a tin which had been prepared during the Boer War. The contents were in perfect condition and delicious to the taste. This tin had travelled from Australia to South Africa and back and thus had suffered vicissitudes in plenty.

It just happens that we have occasionally heard the phrase, "canning for quick consumption", but we feel that any manufacturer worth the name would be horrified at such an idea. The great majority apply stringent tests to ascertain whether their goods have reached sterility, and it would be well for the consuming public to be convinced that such articles are well and truly and *permanently* good, providing they are issued by reputable firms.

Fresh Food?

The person who cries "stinking fish" is always with us. One of them not only wrote the other day that "we Anglo-Saxons with our congenital incapacity for mental precision have always evaded clarity of thought", but averred that it was in this manner that our Empire was won by absent-mindedness.

However pessimistic such declarations may be they have a substratum of truth. Nothing savours more of sophistry than the term "fresh food". It may be profitable to examine for one moment the exact significance of this adjective "fresh". It may be that we find it a vague symbol—a base coin simulating a true currency, long forgotten.

Soup is usually an over-oxidised concoction from the stock-pot. Maybe a little sour from resting. Semi-hydrolysed gelatine solution is a grand medium for micro-organisms. We cede the matter of the judicious hanging of the prime material—meat—with due regard to time and temperature, to the better glorification of enzymic activity and the discomfiture of the saprophytes.

In the towns fresh fish is a delusion to anyone whose palate has been tickled by a sea fish but an hour since having been "on its lawful occasions". The tongue delights in that peculiar tang—slightly iodic—blended of all the mysterious scents of an evening walk by the seashore (let it be hastily added, away from the popular resort!), with a receding tide. The flesh tender but firm. Fresh food, to be contrasted with the sodden variety of the fishmonger's slab, its body cells ruptured or damaged by alternate chilling and thawing.

And so through the whole gamut: the stored potato; the tired cauliflower.

We are not concerned for the moment with the nutritive aspect—that would need a lot of talk.

We have eaten bread from wheat recently harvested, trodden out on a *caucha* by oxen and ground by stone. Fresh food!

And so *ad infinitum*. But, alas! "civilisation" demands the feeding of a concentrated population and science is doing its best. One can only envy the possessor of a potato patch, a small farmyard, and a trout stream or a seashore at its edge.

". . . The bacon industry in this country started at Calne in Wiltshire. It was here that bacon was first cured all the year round . . ."

DR. E. H. CALLOW, *in a recent lecture.*

The Birthplace of Bacon

in Wiltshire, England—CALNE—

Selecting and packing sides of bacon.

THE SMALL town of Calne is delightfully situated in the heart of the Wiltshire Downs, where the soil of England is still rich and the meadows lush with good green grass. It was in the midst of this truly agricultural country that the pork and bacon business of the House of Harris first began in 1770. At one time there were two distinct bacon curing establishments run by members of the Harris family, who for some time competed with each other for the cream of the bacon trade. In 1888 the two establishments were amalgamated, and from the fusion has sprung the great concern of C. and T. Harris (Calne), Ltd., now controlling many factories throughout the country. It is interesting to note that the name HARRIS is the company's distinctive and exclusive brand name and registered trade mark for bacon and hams and other products manufactured by the firm.

That the company has taken into its title the name of the town in which its first and still its largest works was built is of no little significance, for it may be said that Harris is Calne and Calne is Harris. There are 5,000 inhabitants in this quiet, unassuming little town on the main London to Bath road, the majority of those at a working age being employed in the Harris factories, of which there are now really three engaged in the production of bacon and meat products and in dealing with by-products. Even the electricity supply of the town is provided from the generating station in the works.

The centre of Calne, called The Strand, is dominated by the large six-storey modern factory building which is Harris's.

The Largest
BACON AND MEAT PRODUCTS FACTORY
in Great Britain

HARRIS of CALNE

By G. W. LACEY, B.Sc., A.I.C.

THIS BUILDING was begun in 1920; extensive additions have been made from time to time as the growing output and improved methods of production have demanded. Replete with the most modern types of plant and machinery, the firm of Harris may well claim to be one of the finest handling meat products in the country.

Among the very large number of products manufactured at the Calne factory may be mentioned bacon, hams, sausages, cooked hams, brawn, pies, lard, canned meat products, including the well-known chicken and ham roll, goods packed in glasses and tins including ox, calves' and sheep's tongues, boneless chicken, and meat pastes.

It would be impossible, within the scope of this article, to describe in any detail the methods employed in the preparation of such a vast variety of articles, and it is only possible to indicate the general principles involved in the selection and control of material, the handling, preparation, and final packing of the goods. It is by adherence to broad underlying principles employed by Harris that the industry as a whole will maintain the high level of quality for its products.

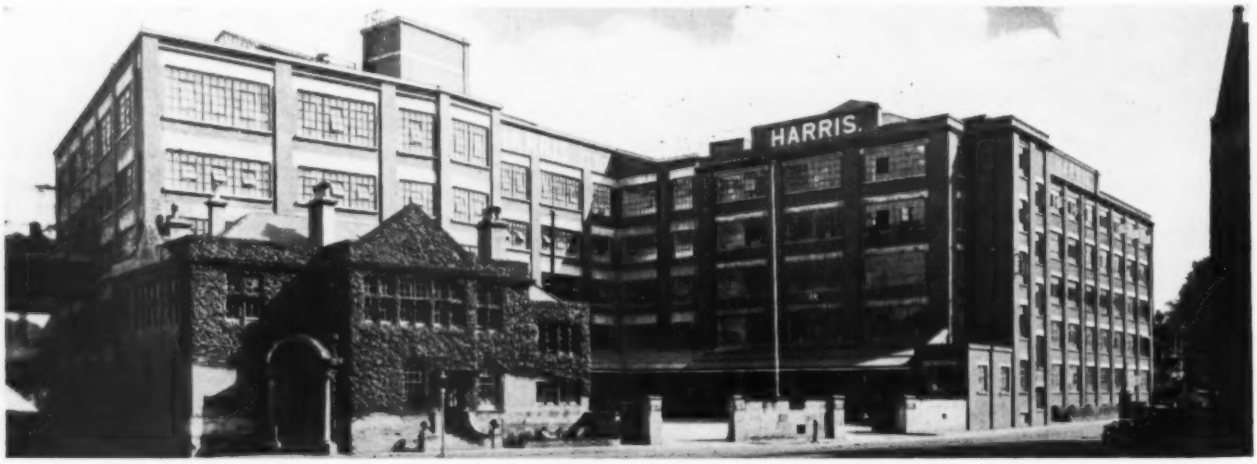
Bacon Production

The Calne factory is capable of dealing with 1,000 pigs a day. Bacon is made by both the original Wiltshire dry cure and tank cure methods.

Pigs are purchased by expert buyers and are housed in pens before slaughtering. Though these are inside the building and under cover, they are effectively isolated from the rooms in which the carcase is afterwards handled, an arrangement which is absolutely essential. The pigs are slaughtered (using a humane electrical stunner in the first place) and pass by runways through the different treatments—scalding, dehairing, singeing, and final scraping and washing—before they reach the department in which the offal is removed, the backbone exposed, and the carcase weighed and sent to the cooling room.

Veterinary Control

It is at this stage that the most important aspect of control enters into the operation. Every carcase, with its internal organs, is examined by a skilled veterinary



The Harris factory from the Strand. The smaller building in the foreground is the laboratory.

View of the curing cellars where the Wiltshire cure is carried out.

assistant, under the supervision of a resident veterinary surgeon, appointed by the local authority for the purpose of devoting all his time to Harris' requirements, and responsible for the passing of all meat used in the making of other products as well.

Cooling

The carcases, after veterinary inspection, are passed by lift to the large cooling room at the top of the building, where they hang until the next day—generally somewhat less than twenty-four hours. In the cooling room air circulation is achieved by having the sides of the room open to the air except for the protection of a wire screen. The open sides can be closed, partially or completely, by shutters to regulate air conditions according to the weather.

The procedure already described is also followed with the larger pigs and porkers, the meat of which is utilised in the making of meat products other than bacon.

The Curing Cellars

After final preparation the side reaches the chill room, in which the temperature (about 40° F.) and the humidity are carefully controlled, and thence passes to the curing chambers. Curing by the methods already indicated is carried out in separate departments, large brine tanks being used for the tank cure. Temperature and humidity are again regulated in both chambers, which are large, well arranged and well lighted, and are fully able to cope with the maximum output of the factory. The cure completed, the sides are washed and subsequently smoked. In this connection it is interesting to note that sawdust from local wood is burnt in the smoke-stoves.

Coming from the smoke-stoves the sides of bacon are selected and packed in lots for transit according to orders received. They are enclosed either in specially made brown paper bags or sewn up in cloth; rolled bacon is strung by machine to secure the tightest possible roll.

Lard

Fat is rendered and refined as lard in a special lard room, described elsewhere. The residue, known as greaves, from the lard-refining operation, possessing a high protein content, is sent to another department for incorporation in pig-feeding meal.

By-Products

Among the by-products, which are handled in a special factory of their own situated in another part of the town, are blood-meal and bone-meal.

Laboratory Control

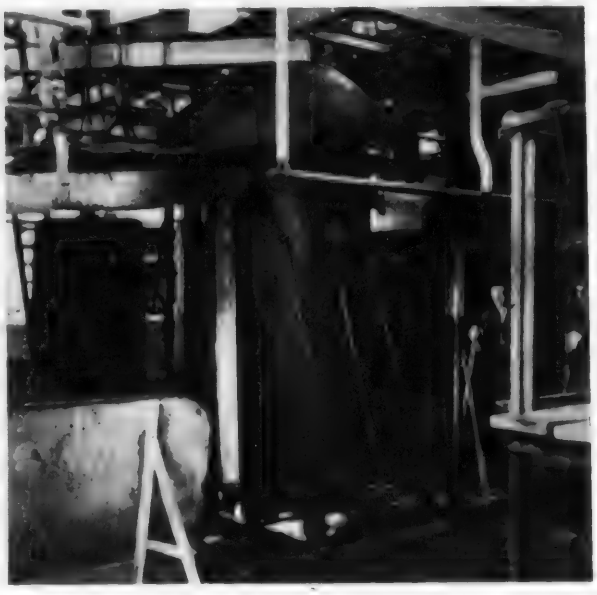
The variety of Harris products makes it necessary for the laboratory work to cover a large amount of ground. Experience has shown that scientific control enters into every productive problem, from coal and other engineering requirements to the bacteriological examination of preserved foods. The curing of bacon, to quote one example, is laboratory controlled at every stage from the composition of the pickle to the moisture content of the smoked bacon. All kinds of raw materials which have to be purchased from outside sources are subjected to examination, and stores are not permitted to issue goods of such a nature without a laboratory certificate.

The laboratory, which is under the control of a fully qualified chemist, serves all the branch establishments associated with the parent company, so that it is completely in touch with branch operations and in a measure responsible for the standardisation of their products.

Scientific and industrial research also forms part of the work of the laboratory. In such ways are methods con-

Left : Bacon-rolling machine. The string, which is given one or two turns round the operator's hand, is guided along the length of the side as the rolling takes place.

Below : Slaughter department, showing singeing furnaces actually taken in operation.



stantly reviewed, improved upon if possible, and new methods devised.

Maintaining Hygienic Conditions

To obtain the best possible conditions for the manufacture of meat products, design and layout of buildings and plant are, of course, all-important factors. Evidence of the thought and care expended upon these items is apparent in all departments of the Calne factory.

Taking the bacon factory as an example, the walls of the curing cellars, the carcase cooling and chilling rooms, and the main factory are lined with white glazed bricks, the floors being of special hard bricks to facilitate cleaning.

The brine tanks, as can be seen in the illustrations, are built of glazed bricks with rounded rims raised about 2 ft. 6 in. above the floor. All the steel work, piping, and metal fittings (where not of stainless steel) are maintained in good painted condition, especially in the curing cellars and the kitchens, on account of the corrosive nature of the brines in the former and the steam in the latter. Special attention has been paid to the electric wiring and fittings, which in the cellars have been specially installed, and are frequently examined to eliminate breakdown due to corrosion. Steam piping in the kitchens and elsewhere is properly lagged.

The top floor of the newer part of the factory on which the kitchen department is situated has a high glass roof without any central supports. This has been designed to leave the floor space as free from obstructions as possible not only for freedom of movement but to facilitate cleaning. Lofty rooms throughout the factory ensure the elimination of steam from the atmosphere. Almost invariably plant and equipment is raised above the floor level on open stands.

All parts of the factory are adequately supplied with cold and hot water and steam for washing-down purposes. Trolleys and equipment are sterilised in a special steam plant built outside the factory.

Wooden equipment has practically been displaced by metal construction, especially in stainless steel and aluminium. Aluminium trucks for handling meat products and stainless steel tops for working tables are to be seen everywhere in the factory.

Wherever possible actual handling of the products at any stage is prevented, except for instance, in the boning and butchering operations.

The workers wear white overalls and caps, the butchers providing a splash of colour with their blue overalls and aprons. The general impression of efficiency is enhanced by the immaculate appearance of the operatives.

Cans and glass jars in which meat products are packed are all washed and are sterilised and dried in mechanical plant immediately before use.

Manufacture of Small Goods

For the cutting up of heads and other large parts power-driven band-saws are employed, as it is found that they make a much cleaner cut through bone than a chopper and are quicker. Women are employed to trim pieces of meat and fat from bones, etc., so that every morsel is utilised in some way or other.

In the kitchens separate lines of equipment have been installed for the production of the different goods, such as meat pastes, glass packs, and large sausages. The meat paste plant, for example, is quite self-contained, being composed of a mincing machine of the type in which the meat is forced by screw through a series of slotted cutting plates, and a tilting type of mixer with rotating arms in which filling, seasoning, etc., may be incorporated. The plant is complete with paste-filling and lid-seaming machines and is connected by means of runways.

In this way the different units of plant are kept free for their particular purposes and there is no overlapping of production to cause delay.

The essential plant and equipment for the preparation of other goods comprises much the same types of mincing, chopping, and mixing machinery. Glass jars are washed, sterilised, and dried by machinery. Exhausting of glass packs is done in the usual type of steam exhauster and the packs are closed with the Phœnix type of closure for the seaming of which several machines are employed. The lids are made and lacquered in the can-making department in the factory.

Brawns and similar moulded goods, galantines, and large sausages necessarily involve a certain amount of hand work. Glaze is made up in jacketed boiling pans of stainless steel construction and applied to the goods standing upon flat trays. Decorative work is a skilful hand job.

Cooked sausages are filled by forming cylindrical shapes of meat (in metal moulds) by pressure from a sausage-filling machine, hand controlled.

For cooking, the sausages are suspended from racks and boiled, the time of boiling varying according to the kind and size. The sausages are afterwards hung up to cool before they are labelled and packed.

Ham boiling forms another completely separate section in the kitchens.

The Sausage Plant

For a very large production of sausages of several kinds a well-organised plant is essential. The "Simplex" sausage machines, in which the meat is finally prepared, are of the latest type, with enclosed motor drive and smooth construction. The prepared meat is conveyed from the line of machines to the filling room in aluminium trucks, and here are line after line of tables at the head of each of which is a pressure-filling machine of the piston type capable of holding 90 lb. of meat. The filled sausages pass along the table, are weighed off into pound lengths on dial-faced scales, twisted, labelled, wrapped, and packed by the deft hands of the girls who stand along both sides of the line. The whole arrangement gives one the impression of simplicity, orderliness, and efficiency.

Canning Operations

All cans used for the Harris packs are made in the factory, can-making plant having been installed as long ago as 1918. For some of the larger packs, like ox-tongue or brisket of beef, the cans are made up by hand upon special jigs from the tinplate blanks. The canning department itself is one of the largest in the factory.

Cans of the open-top type are sterilised before being filled from the nozzle of an extruding machine specially adapted for the purpose. One of our illustrations shows a canning line in operation.

Lids are partially seamed on before exhausting, after which operation they are finally seamed. Seaming is done by means of a very useful universal type of machine, capable of accommodating various shapes and sizes of cans. This is necessary because the range of the company's packs is so diverse.

A large number of horizontal retorts, each taking about 400 cans, is installed in one line in the canning department. The retorts are all fitted with temperature recorders (whereby the temperature of processing is shown from start to finish of the operation) as well as the usual thermometers and pressure gauges.

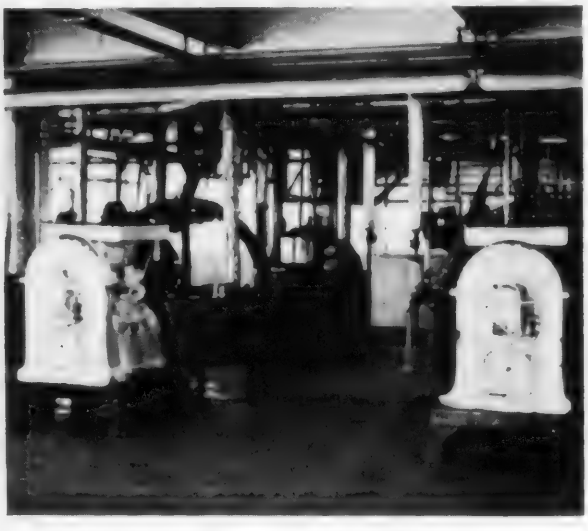
The packed cans are automatically cooled and are sub-

Steam-jacketed aluminium cooking pans.

The sausage plant. Sausage machines are of the latest pattern with separate enclosed motor drive and smooth finish.

Left: Lard filling, showing cooling drum of American design. Lard is circulated to the special stainless steel filling valves operated by foot, the bags in this case being placed on a weighing machine by hand.

Below: Lard department, mincing machines in foreground, lard melters immediately behind.



Left: Kitchen department of the ham boiling section. Note the high glass roof which makes the room light and permits steam to be taken away. In the foreground are two stainless steel jacketed pans in which glazing is prepared.

sequently labelled (also by machine) and packed into boxes.

The Lard Room

The lard room in the factory is particularly interesting, containing, as it does, plant of local design and construction. After mincing, for which two machines with totally enclosed motor and gear drive and white vitreous enamel finish are provided, the fat is fed into large, shallow melters fitted with a special type of stirring gear. The stirrers revolve and have rotating arms which produce rapid and efficient motion and so prevent burning. The vessels are jacketed and heated by steam. The stirring gear is belt-driven through a worm above. Around the central driving shaft in the pan is fitted a sieve to entrap portions of meat and fibre as the rendered fat is pumped out of the melter, through a settling trap and sieve to another jacketed holding-tank, in which further settlement takes place. Eventually it is transferred by pumping, again through fine mesh sieves, to a jacketed stirring tank, from which it runs by gravity to the cooling rolls in the packing plant below. It should be particularly noted that all plant in this room is raised well above the floor for hygienic reasons.

In the cooling and filling room the lard is cooled on large drums, from which it is scraped at a consistency at which it can just be pumped through the pipes of the filling system. This system is supplied by a circulating pump with a by-pass, so that the pressure is constant even if no lard is being drawn from the filling valves. The piping has union joints at short distances apart to facilitate dismantling in the event of blockage.

At the filling points special stainless steel valves with nozzles are fitted. These can be operated by foot, the paper bag, held in a tin box, being placed on scales under the nozzle. The rapidity with which the girls fill the bags and the accuracy of measurement attained is remarkable.

The filling of bladders, for which quite an elaborate plant has been devised, is equally important. To relieve the weight and consequent strain on the neck of the bladder, the filling nozzles are fitted over a tank of water. The same type of stainless steel valve is employed. The bladder is collapsed to exclude all air, secured to the nozzle, and filled. It is then tied round the neck, removed from the nozzle, and left in the water for the lard to cool and solidify, when it can be easily handled.

A view of the laboratory.

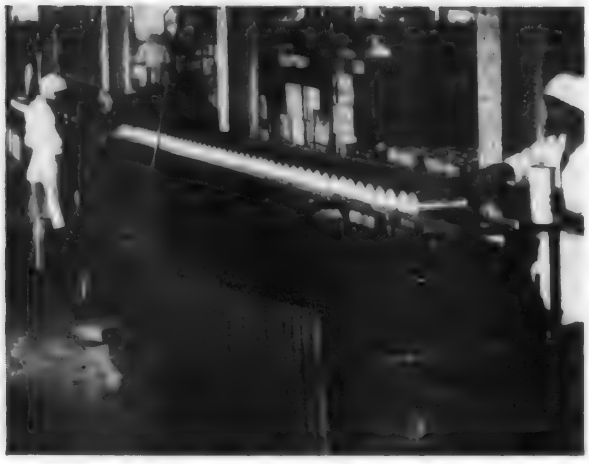
Pies

Of the other departments in the factory a very important one is the pie-making department, which is provided with electrically driven pie-making machinery for extruding paste into the pie-dish, for filling pies with meat, and finally for trimming the top and edge of the paste. A large pastry-rolling machine is also in use, and the three baking ovens are of the draw-plate type.

Dressings

Next to this department is a room in which bread raspings are produced for dressing hams and galantines. Owing to the large quantity of this material used, a motor-driven, high-speed disintegrator is required to break down the baked mixture. Another important supply department is concerned with the mixing and sifting of seasonings, for which a mechanically driven combined mixer and sifter of well-known make is employed.

A long line of retorts in the canning department.



A can labelling line with automatic labeller.

The Sahib's Bacon

Perhaps the most unusual of the smaller departments of the factory is the one quietly occupied in packing bacon for export, especially to colonial and dominion tropical countries. This entails an elaborate method of packing. Indeed, the packing operation has almost to be seen to be believed. A pound of bacon cut into rashers is wrapped successively in greaseproof paper, cheese cloth and greaseproof paper, and is then put into a muslin bag and tied up like a parcel with a strong string. After this it is sewn up in strong calico, and finally the whole package is dipped into a gelatine mixture in which it is allowed to soak for a short while. Following this the hermetically sealed package is hung up for the composition to dry hard. Bacon will keep in these packages for for a long time, even in a tropical climate.

This description is just typical of the thorough way in which all branches of the manufacturing activities of the company are undertaken. There is no doubt that the attention continually devoted to the improvement of construction and layout of buildings, plant, and equipment, of veterinary and laboratory control, organisation and management of workers and staff, is responsible for the high standard of quality of the company's products and the success of their industry.

Thanks are given to the directors and staff of the company for their kindly co-operation, help, and information given during our visit.

The following firms were contractors for plant, equipment, and materials :

SAUSAGE MAKING.

Mincing Machines for preparation of Sausage Ingredients : *J. C. Wetter and Co., London.*

Simplex Silent Sausage Meat Chopping and Mixing Machines : *John Gardner and Son, Birmingham.*

Sausage Filling Machines : *Spenser, Melksham.*

MEAT PASTE MAKING PLANT.

2-Roll Grinding Machine with Granite Rolls : *Baker Perkins, Ltd., Peterborough.*

Mincing Machine (as in Sausage Plant) : *J. C. Wetter and Co.*

Chopping and Mixing Machine (similar to Sausage Machine) : *John Gardner and Son.*

Mixer of Tilting Type with Rotating Arms : *John C. Smith.*

Filling Machine for Glass Jars : *J. G. Jackson and Crockett, Ltd.*

Lid Seaming Machine for Glass Jars : *Lee and Co., Ltd.*

MEAT PACKS IN GLASS.

Seaming Machine for Glass Jars with Phœnix Type Closures : *E. W. Bliss Co., London.*

Tunnel Type Exhauster for Glass Packs : *Mather and Platt, Ltd., Manchester.*

Labelling of Glass Jars : *Purdy Patent Machinery Co., Ltd., London.*

CANNED MEAT PACKS.

Half-Seaming of Can Lids : *Waller and Co., Ltd., London.*

Exhausting of Cans : *Mather and Platt, Ltd.*

Final Seaming of Cans : *Maxams Machine Co.*

Retorts : (1) *James Abernethy;* (2) *Waller and Co., Ltd.*

Labelling of Cans : (1) *Beth Label and Wrapper Machines Co.;* (2) *Andrew and Suter, Ltd.*

Recording Instruments : *Cambridge Instrument Co., Ltd.*

SEASONING DEPARTMENT.

Mixer and Sifter : *Wm. Gardner and Sons (Gloucester), Ltd.*

LARD PLANT.

Mincing Machines (Pork Sausages) : *J. C. Wetter and Co.*

Melters (with Stirrers) : *E. W. Maundrell and Co., Calne.*

Cooling and Filling Equipment : *The Albriqet Nell Co.*

PIE MAKING EQUIPMENT.

Pastry Rolling : *Baker Perkins, Ltd.*

Paste Extending, Meat Measuring, and Shaping and Trimming Machines : *C. O. Ericsson Engineering Co., Ltd., Birmingham.*

Peel Ovens : *Baker Perkins, Ltd.*

BREAD RASPINGS FOR HAM.

Grinding (and Disintegrating) Machine : *J. Harrison Carter Ltd., London.*

CAN MAKING PLANT.

Lid Stamping and Forming Machine : *E. W. Bliss Co.*

Universal Seaming Machine for Bottoms : *Maxams Machine Co.*

MISCELLANEOUS EQUIPMENT.

Bacon Rolling Machine : *J. G. Jackson and Crockett, Ltd.*

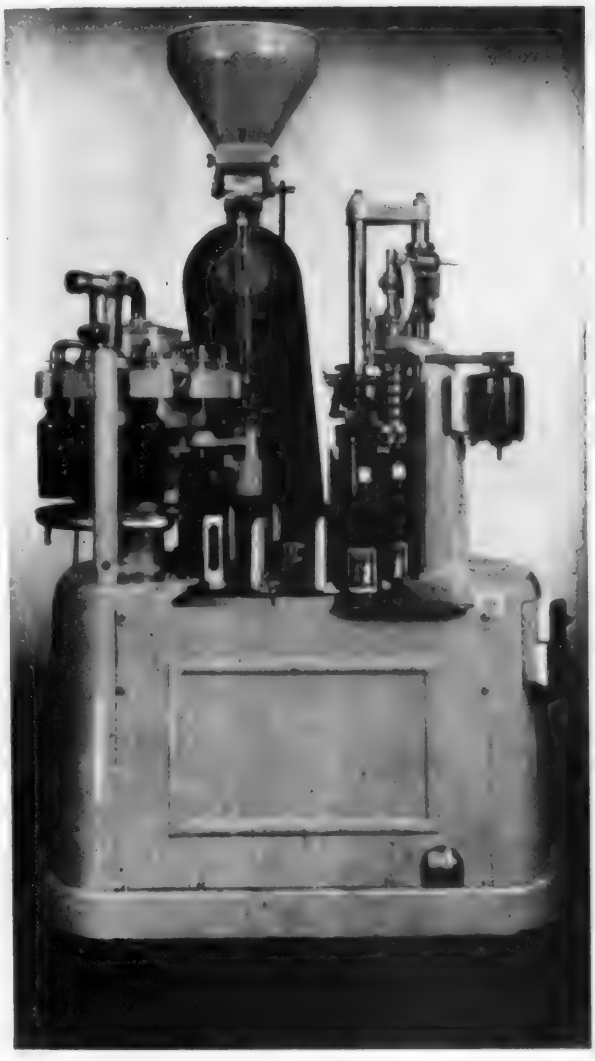
Steam Jacketed Boiling Pans in Aluminium and Stainless Steel : *Aluminium Plant and Vessel Co., Ltd.*

Weighing Machines (various) : (1) *W. and T. Avery, Ltd., Birmingham;* (2) *Salter, West Bromwich.*

Air Filters : *Visco Engineering Co., Ltd.*

Generators : *Bruce Peebles and Co., Ltd., Edinburgh.*

Canning department. Chicken and ham roll filling as described.



COMBINED FILLER, STOPPER, LABELLING, and CAPPING MACHINE

FROM Paris come details of the new Bras Cav manufacture—a unit capable of filling, stoppering, labelling, and capping bottles. The machine is built on a single base with only one revolving plate, except for the bottling, for which the bottles are automatically removed from the main revolving plate and put into position on a filler plate. The filler is designed to stop the flow of liquid when this reaches a certain level. As a result all sizes and shapes of bottles can be filled at the same time without any difficulty.

The filled bottle is returned to the main rotary plate and carried on to the second position, in which a cork or other stopper is fitted into it. This operation is designed for rapid execution to permit stopping the bottle without any air in it.

The third operation is that of labelling. The machine used for this purpose has been very much simplified, so that dangers of a breakdown are reduced. An innovation in the construction of the labelling is that the paste roller is operated by a motor separate from that operating the machine. This means that the machine can be stopped at any time and restarted without the danger of the paste having either dried or run off the roller.

The final operation is that of capping with a lead or aluminium cap. The cap has to be placed on the top of the bottle by hand, the machine then drawing it down and fastening it securely on the top. This means that at full speed of about 1,000 bottles per hour the machine requires two hands, but at slow speeds it is possible for the same worker to place the caps and remove and replace the bottles.

The machine is provided with automatic stoppage in case a bottle either does not enter or does not leave the filler, or in case of breakage of a bottle at any one of the points of the combination. Another feature of the machine is that the parts are arranged to permit each of the operations to be constantly visible to the operator.

LA ROCHELLE ABATTOIR

THE town of La Rochelle has just completed the construction of a new municipal slaughter-house. This building, which replaces one built over a century ago, is equipped with a modern installation and provides accommodation for a somewhat increased capacity. The building was erected on the same site as the old, and is in concrete and stone. It consists of four main buildings and a number of smaller ones. At the entry of the grounds is a small pavilion which houses the porter's lodge and the tax collector's office. To the right of this, in a second small building, is the office of the veterinary inspector. Two twin buildings connected by a concrete shed serve to house the cattle and the sheep before slaughtering, while the shed serves as a market place. This building is to the left of the entrance. In the centre of the grounds is the slaughter-house proper. This contains the large slaughtering hall, beyond which are separate rooms for the cleaning and the cutting up of the animals. These lead directly to the large cold storage room for meat. At the end of the building but with a separate entrance is placed the pig-house. The slaughtering of horses and mules takes place in a separate small building placed between the large slaughter-house and the entrance. This building also contains the stable for horses before slaughter. Running the full length at the back of the grounds is a low building which is used for the preparation and storage of the various by-product articles. Here are arranged separate rooms for the hides, tripe, and guts, etc.

NITRITE IN CURED MEATS

(Specially Communicated)

Despite the fact that bacterial action, over which no absolute control exists, produces nitrite from nitrates during the curing of meats, the use of this salt is prohibited in this country. The author gives figures showing progressive nitrite content increasing according to the age of the meat, and stresses that in America and Germany, etc., the use of nitrite is permitted.

THIS MATTER has been the subject of considerable discussion both in the technical press and elsewhere during the past ten years or so, but in spite of all which has been written about it, the situation has remained unclarified, and the manufacturer of cured meats is in the unhappy position of having to offer his goods for sale when they contain a substance the presence of which is prohibited under the Sale of Food and Drugs Acts, and which not only has he not put there but without which the article would not be cured meat. The existing Regulations, under the definition of the term "Preservative", permit the use of common salt, saltpetre (sodium or potassium nitrate), sugars, lactic acid, acetic acid or vinegar, glycerine, alcohol or potable spirits, herbs, hop extract, spices and essential oils used for flavouring purposes, or any substance added to food by the process of curing known as smoking. One looks in vain for any mention of nitrite, and it must be assumed that the mechanism of curing meat was not considered at the time the Regulations were drawn up.

Lack of Control

This is a regrettable oversight, for as the law now stands curers may not use nitrite in their process and thus be able accurately to control the amount of this substance present in the finished product, but must leave its production to natural agencies, with no control over the amount formed or the quantity remaining in the meat. Surely this is a state of affairs needing some action upon the part of the authorities responsible for the purity of public food.

Osman Jones (*Analyst*, 1933, **54**, 140) quoted the following figures from the *Journal of Agricultural Research*, 1926, **33**, 54. They concerned the formation of nitrite in a nitrate pickle, the data being expressed as parts of sodium nitrite in one million parts of the pickle.

Fresh.	*5th Day.*	*20th Day.*	*30th Day.*
2·6	10·0	138·0	189·0
40th Day.	*48th Day.*	*55th Day.*	*62nd Day.*
421·0	540·0	700·0	826·0

Further figures showed the presence of nitrite in nitrate-cured meat, the quantity present varying with the age of the meat and possibly other factors, such as the temperature at which the meat had been held.

American hams ..	Nitrite 72 to 960 parts per million
American bacon (various) ..	,, 36 to 640 ,, ,, ,,
Corned beef ..	,, 2·4 to 45 ,, ,, ,,

It is obvious from the above that the amount of nitrite in nitrate-cured meat can reach a point at which objection could be reasonably taken on the grounds of detriment to public health.

Bacterial Changes

Some of the changes which meat undergoes during cure are as yet obscure, but the formation of nitrite has been the subject of much investigation and the nature of the change is reasonably well established. Polenske in 1891 found nitrite in used meat pickle, and expressed the view that it resulted from the reducing action of bacteria upon the nitrate present. We now know that his opinion is correct, and that a small amount of the nitrite so formed proceeds to link up with the hæmoglobin present in the meat to form nitric oxide hæmoglobin, or what is more commonly called nitroso-hæmoglobin.

Three of the essentials needed to bring about the reaction are (1) the necessary micro-flora, (2) the presence of protein matter in a form which can be assimilated by the organisms, and (3) the presence of nitrate in considerable excess of the amount of nitrite which the organisms are capable of producing.

Action During Pickling

When meat is immersed in a pickle, some of the proteins of that substance pass into solution, and at the same time a quantity of the pickle finds its way, by diffusion, into the meat, which therefore carries with it nitrate, salt, and nitrite, as well as nitrate reducing bacteria when it is removed from the pickle bath. These organisms con-

tinue to react with the excess of nitrate present in the meat with the production of further amounts of nitrite, and the extent of this reaction is beyond the control of the curer. It will thus be understood that nitrite in varying quantities must be expected to be found in nitrate-cured meat, and that such amounts are those which have been produced by bacterial action, they may be quite small or relatively great, it being impossible to regulate the reducing action upon quantitative lines.

The popularity of mild-cured bacon, which is manufactured for quick consumption, precludes the probability of such bacon containing more than a small amount of nitrite, for the length of time which elapses between the commencement of the formation of the nitrite and the consumption of the meat is too short to allow heavy nitrite production, but even under these conditions considerable variation is manifested.

Control in America

It was recognised over thirty years ago by American food technologists that some control of the amount of nitrite in cured meat was desirable, and curers in that country advocated the use of pickles from which the nitrate was entirely excluded, the amount of nitrite required being introduced in the form of either sodium or potassium nitrite, thus eliminating entirely the need for either the presence of the bacterial flora and the nitrate. By this means the quantity of residual nitrite in the cured meat could be very closely controlled.

The United States Department of Agriculture carried out a series of exhaustive experiments, the details of which were published in the *Journal of Agricultural Research* (1926, **33**, 54). The object of the tests was to ascertain if nitrite could be successfully substituted for nitrate in curing pickles. It was found that "there could be no objection to the substitution of nitrite for nitrate from the standpoint of public health". Further, it was shown that the residual nitrite in nitrite-cured meat was less than that in nitrate-cured meat, and moreover it contained no residual nitrate.

As the result of this extended test, the use of nitrite in the preparation of cured meat is now permitted in the United States of America, the amount of this substance in the finished product being limited to 200 parts per million parts of meat. Work of a similar nature was undertaken in Germany by Reiss, Mayer and Muller (*Z. Unters Lebensm.*, 1928, **55**, 325), as the outcome of which they confirmed the views expressed in America, and the use of nitrite for meat curing is now permitted in Germany.

Function of Nitrate

So far as can be ascertained, the function of nitrate in the cure of meat is confined to furnishing the material for the formation of nitrite by bacterial action. It is possible that it does play some other part. It has been suggested that the oxygen liberated by its conversion to nitrite inhibits the growth of anaerobic organisms in the meat, and thus putrefactive changes are retarded.

Extended experiments have failed to show any material differences in meat cured with nitrate or nitrite, both as regards flavour, palatableness, etc. In regard to colour, meat cured with nitrite is generally superior, for excess of nitrite imparts to the meat a greenish tinge, due to the formation of complex compounds with the hæmoglobin, and it is not by any means always possible to avoid some excess when working with a nitrate pickle.

Colour Control

Callow (Food Investigation, Leaflet No. 5, D.S.I.R., Bacon Curing) states that "The amount of nitrite necessary to impart the characteristic cured colour is surprisingly small, and perfectly cured bacon contains only about 3 parts of nitrite per 10,000". It may be readily understood from these figures that with no control over the amount of nitrite produced by bacterial action upon nitrate, this very small amount may be exceeded to a point where the cured colour is spoiled.

Another not altogether unimportant aspect of the matter is that because the presence of bacteria is no longer required in a nitrite pickle, it is possible to inhibit the growth of undesirable putrefactive organisms by working with a brine or pickle of slightly acid reaction. This does not interfere with either the production of the nitroso compound or the colour of the finished product, but certainly minimises the risk of putrefaction.

Summary

If the use of nitrite in limited amount were permitted in this country, as it is in America and elsewhere, the advantages accruing would be:

(1) A definite safeguard against the presence of too much nitrite in cured meats.

(2) Provide the curer with an accurate means of controlling the mechanisms of his operations.

(3) By limiting the permissible amount would make it possible for proceedings to be taken under the Foods and Drugs Act when excess was found to be present.

(4) Probably prolong the life of the cured meat by reason of the reduction of the number of bacteria in it.

(5) Simplify curing methods.

(6) Obviate the possibility of excess of nitrate in the meat.

It appears that there is no sound reason for the continued prohibition of the use of nitrite for meat curing in this country, and if objection to the presence of excess of nitrite in food is reasonable, then it can be overcome by permitting its use in limited amounts, and thus removing the possibility of over-production by bacterial action by nitrate reduction.

BRITISH INDUSTRIES FAIR, 1938

ARRANGEMENTS for the 1938 B.I.F. are now published, and copies of the *General Regulations for Exhibitors and Application for Space* may be had from the Department of Overseas Trade, 35, Old Queen Street, S.W. 1.

The Fair will be held at Olympia and Earl's Court, the Foodstuffs Section being at Earl's Court. The minimum amount of space bookable is 36 sq. ft.

PRESERVATIVES IN FOOD

By T. W. Corran, B.Sc., Ph.D.

THERE WAS a day when a man would kill his meat and eat it in the raw state; when his worldly vision was limited by the orbit of his narrow experience and his food supply was confined to, metaphorically speaking, a few yards either side of him. Even in those days preservation of food was practised. In the present state of civilisation and habits, preservation is probably the most important process undergone by foodstuffs. Very few foodstuffs are eaten in the unpreserved or untreated state. Even eggs and milk are coming more extensively into line with other foods.

In discussing the methods of preservation, therefore, one must endeavour to remember that practically all foods are preserved, but that the methods of preservation differ. Moreover, much of the important industrial research being carried out to-day deals with improving methods of preservation, for it is recognised that the preservation of food is a necessary condition for the existence of our present methods of living.

Methods of Preservation

These differ widely. It is found that in certain instances natural preservatives are present in foods. Some seeds contain natural anti-oxidants which delay the development of rancidity in the fats of these seeds. A number of spices and condiments, such as mustard and cinnamon, have natural preservative properties which render their value in foods not merely confined to their flavours. In general, however, it may be said that the life of our food has to be extended by intelligent scientific treatment. This treatment may evolve itself into a control of external conditions; adoption of a sterilisation or pasteurisation process; control of composition by a process such as drying, or in the selection of a manufacturing formula; or by the addition of natural or artificial preservatives. Modern opinion is generally agreed that the last method—namely, that which makes use of artificial preservatives—should be a last resort when other known methods have failed.

Ethics of Preservation

Two main considerations should guide the food manufacturer and food chemist. Foodstuffs should be produced to have the strongest æsthetic appeal—they must be as fresh and natural in flavour and appearance as possible—and should be of the highest physiological value. It is this last consideration which should logically govern the method of preservation. It has been recognised in this country in the Food and Drugs (Adulteration) Act 1928, which, in Section 2, allows the addition of ingredients or materials *not injurious to health* which are necessary for the production or preparation of foods or drugs in a state fit for consumption or carriage but not for concealment of inferior quality.

Recognised Methods

Preservation of food resolves itself in general into the prevention or limitation of the activity of moulds, yeasts and bacteria. Rigid control of methods of production has contributed to the solution of this problem in many cases. Probably the best instance of this fact may be seen in the dairy industry where the adoption of scientifically clean methods has given a marked tendency towards products of higher bacterial purity and extended life. With other products care and speed in handling have reduced the deterioration caused by these agents. The parts played by heat and dehydration as means of preservation are well known and recognised everywhere without question.

Certain other processes, such as pickling and smoking, are also unquestioned on ethical or legal grounds. These involve the use of so-called natural preservatives, which include salt, saltpetre, sugars, lactic acid, acetic acid and vinegar, glycerine, alcohol or potable spirits, condiments, herbs, hop extract, spices and essential oils, and any substance added to food by the process of curing known as smoking. It may be said that in general the use of this class is governed largely by flavour considerations with the possible exception of the amount of nitrite in pickle into the consideration of which physiological factors enter.

Chemical Preservatives

The addition of chemical preservatives does not, however, pass unquestioned. In most countries legislation has been passed either to prohibit or to control their amounts. The manner and extent of the recognition of their use varies. In England their use is prescribed and

limited, but they need not in general be declared. Most other countries require their declaration on the label. The quantities allowed vary in different countries, the limits varying in certain cases apparently illogically. As an instance one might quote the Canadian regulations which allow only 100 parts per million of sulphur dioxide in fruit juices generally, but allow 500 parts in lime juice, which is generally recognised as being more stable than lemon juice, and in the unracked condition can exist in a sweet condition without the addition of chemical preservatives.

Should Chemical Preservatives be Allowed?

The issue narrows down to two main questions. Are chemical preservatives necessary and are they permissible on physiological grounds? The answer to the latter question is not easy and requires extended work. In many cases conflicting evidence is produced. One has not only to consider the lethal dose of a substance, but also the effect of minute cumulative doses in the body. Tracing the fate of chemicals in the system and their physiological effects is often difficult.

The main chemical preservatives used have been sulphur dioxide and sulphites, benzoic acid and benzoates, boric acid and borates, salicylates, fluorides, formic acid and formaldehyde. Of these, sulphites and benzoates are the two most generally recognised. In the case of the other substances, strong evidence against their use has, in general, led to their prohibition. Fluorides were found to replace phosphate in bone. Other preservatives were shown to affect digestion and are known to be gastro-intestinal irritants. On these bases all save sulphites and benzoates are prohibited in this country. Some other countries still allow formic acid, salicylic acid and borates.

Whereas it is known that large quantities of sulphur dioxide are harmful, this substance is easily oxidised in the body to sulphate so that its use seems allowable. The amounts ingested are not likely to have any effect on the enzymic processes occurring in the body. Benzoates are also easily eliminated from the body without apparently any harm. Apart from the more commonly used sodium benzoate, another class of active preservatives—esters of parahydroxy benzoic acid—has been suggested. Nipagin, one of these esters, is reputed to be physiologically safe, but as yet is not universally recognised for foods or drugs.

A Last Resort

As has been mentioned, modern opinion is that chemical preservatives should be admitted as a last resort. Their use should be governed by the requirements of good commercial practice. Whereas it might be possible to pack a product such as fruit juice in small containers without preservatives, relying on pasteurisation, could we dispense with their use for the transport of large quantities of raw juice in barrels? In this instance, sulphur dioxide is a good preservative, since it keeps the raw juice, but may be largely removed if necessary during the incorporation of the juice in other products such as cordials, etc. For a similar reason it is popular in the wine industry. Furthermore, the protective function of preservatives often begins after the product has been bought and remains in its part-used state under conditions over which the manufacturer has no control. On this score there is a justification for the addition of preservatives to cordials and fruit products. As the law stands at present, either sulphites or benzoates may be used in this country for preservation of cordials, etc. Might it not be advisable to allow both? Sulphites preserve the colour of some light-coloured juices (preventing darkening), but on keeping disappear both by evaporation and oxidation. Benzoates tend to darken these juices, but are stable in other respects. What objection could there be to a combination of these two preservatives to obtain the best protection from both?

Improved methods of processing and packaging may further reduce the necessity of chemical preservatives, and newer preservatives may be found without the disadvantages (flavour and aroma) of those at present in use; but in the present state of our knowledge, sulphites and benzoates are fulfilling a useful and necessary function if carefully controlled by food chemists.

International Position

Whereas in most cases sulphites and benzoates alone are permitted as preservatives, there is no general international agreement on this question. Thus, for instance, Germany allows the use of formic acid and benzoic esters. Another point of difference is the need for declaration. This country does not require the declaration of preservatives in most cases, whilst others require the declaration of all preservatives. Some countries prohibit all chemical preservatives.

The two main classes of products in which preservatives are allowed are meat and meat products and fruit and fruit products respectively. The lack of uniformity in the regulations of different countries is illustrated in the accompanying tables.

SAUSAGES AND SAUSAGE MEAT.

Country.	*Preservative Allowed.*	*Amount (Parts/ Million.)*	*Declaration.*
United Kingdom ...	Sulphur dioxide	450	Required
South Africa ...	Sulphur dioxide	450	,,
	Benzoate	770	,,
	Boric acid	770	,,
Australia	Sulphur dioxide	500	,,
New Zealand ...	Sulphur dioxide	500	,,
Canada	None	—	—
U.S A.	Sulphur dioxide	Reasonable amounts	Required
	Benzoate	,,	,,
Most European countries	None	—	—

FRUIT JUICES, CORDIALS, SYRUPS, ETC.

Country.	*Preservative Allowed.*	*Amount (Parts/ Million.)*	*Declaration.*
United Kingdom ...	Sulphur dioxide	350	Not required
	Benzoate	600	,, ,,
Canada	Sulphur dioxide	100	Required
	Benzoate	1,000	,,
Australia	Sulphur dioxide	230	,,
	Benzoate	800	,,
New Zealand ...	Sulphur dioxide	230	,,
	Benzoate	230	,,
South Africa ...	Sulphur dioxide	350	,,
	Benzoate	600	,,
Germany	Sodium benzoate	1,800	,,
(Fruit juices for further treatment)	Sulphur dioxide	1,250	,,
	Pot. metabisulphite	4,350	,,
	Benzoic ester	900	,,
	Formic acid	2,500	,,
Fruit lemonades	Be zoate	500	,,
	Benzoic ester	500	,,
Holland	Sulphur dioxide	20-50	Not required
	Benzoate	250-400	,, ,,
France and Belgium	None	—	Required
U.S.A.	Sulphur dioxide	Small amounts	,,
	Benzoate		

Reference has already been made to the relatively large amount of sulphur dioxide allowed in Canada in lime juice (500 parts per million).

From the above tables the lack of uniformity can be seen. A striking comparison is to be found in the lack of proportionality between the relative amounts of sulphites and benzoates allowed in different countries.

Although climatic conditions in the different countries in the world are responsible for some variation in the quality and quantity of chemical preservatives used, it does not seem to the writer that there has been any big effort made to correlate the preservative regulations existing in different countries. There seems to be no scientific reason why such agreement should not be attained, and it would certainly help manufacturers considerably.

Efficiency of Permitted Preservatives

It is suggested that the use of chemical preservatives should be governed by the requirements of good commercial practice. The amounts generally permitted in articles for sale are insufficient in themselves to ensure complete preservation unless careful consideration is given to cleanliness in methods of production, care in choice of formula and to storage temperatures. This is as it should be, for it would probably be a mistake to allow the use of a preservative in such quantities as to cover lack of cleanliness from the bacteriological point of view.

Generally speaking, articles to which chemical preservatives are added do not rely entirely, or even to a major degree, on these chemical preservatives for their preservation. Thus fruit cordials derive a certain degree of preservation from their sugar and acid contents. The recent arrivals on the market—namely, fruit syrups—are very largely preserved by the sugar content, and with clean methods of manufacture very little if any trouble should arise in preserving such products with the help of the concession allowed by the Preservative Regulations.

In short, the provisions of the English Preservative Regulations presuppose clean processes.

ANALYSIS of CITRUS JUICES*

Analysis.	*Seedling Orange.*	*Blood Orange.*	*Valencia Orange.*	*Lue Gim Gong Orange.*	*Marsh Seedless Grapefruit.*	*Seedy Grapefruit.*	*Tangerine.*
Citric acid, per cent.	0·74	1·11	0·98	1·05	0·89	1·35	1·26
Sp. gr., 20°/20° C.	1·051	1·049	1·048	1·051	1·028	1·039	1·058
Degrees Brix	12·65	12·15	11·80	12·60	6·95	9·74	14·33
Maturity ratio	17·09	10·95	12·04	12·00	7·81	7·22	11·37
*p*H	3·6	3·2	3·5	3·3	3·0	3·0	3·2
Water, per cent.	87·35	87·85	88·20	87·40	93·05	90·26	85·67
Organic matter, per cent.	12·20	11·67	11·39	12·20	6·73	9·33	13·93
Nitrogen, organic, per cent. ..	0·099	0·092	0·090	0·094	0·043	0·052	0·069
Protein (N×6·25), per cent. ..	0·62	0·58	0·56	0·59	0·27	0·33	0·43
Reducing sugar, per cent. ..	4·48	3·95	3·46	4·32	3·44	3·96	3·09
Sucrose, per cent.	4·86	4·97	5·02	4·89	1·34	2·24	7·89
Total sugar, per cent.	9·34	8·92	8·48	9·21	4·78	6·20	10·98
Pectic acid, per cent.	0·006	0·002	0·005	0·007	0·004	0·004	0·025
Ash, per cent.	0·453	0·482	0·412	0·403	0·218	0·414	0·401

* Roberts and Gaddum, *Ind. Eng. Chem.*, **29**, 5, 574.

Photograph by courtesy of Black and White Milk Bars Ltd., who operate 17 bars and serve something like 30,000 milk shakes a day.

FLAVOURED SHAKES FOR MILK BARS

By L. J. HYNES

A SHORT time ago an ice-cream manufacturer commented to the writer that milk bars would go the same way as the soda fountain. It is to be hoped not. The soda fountain has gone the way that everything goes, in time, but it has gone that way at least half a century too soon. One refers, of course, to the soda fountain in this country; in America it flourishes still, and will probably continue to flourish for many years to come, but the soda fountain in England is almost non-existent. Probably there were several factors which contributed to its passing, and of these factors one of the chief, if not indeed the chief, was the widespread use of artificial fruit flavours in the sodas and other drinks. The ice cream manufacturer who predicted the speedy death of the milk bar was thinking of this.

Pure Fruit Juice

One cannot agree with him. From the very outset, the policy of the milk-bar pioneers and of the Milk Marketing Board, as of the association subsequently formed to safeguard milk-bar interests, has been to discourage very strongly the use of any but pure fruit juices in milk shakes. It has been heavily stressed that no artificial flavour or fortified essence is good enough for a milk shake, and it is pleasing to note that the overwhelming majority of milk-bar traders have proceeded accordingly. Hence, one cannot agree with the prophecy of the manufacturer referred to. There is ample evidence that he is entirely mistaken in suggesting, or implying, that milk-bar owners as a body are using synthetic flavours for their shakes. He is correct up to this point: some few traders may be using such flavours, and if, in thus seeking hopelessly false economy, they persist in this policy, they will not only harm their own bars, but will very seriously threaten all other bars as well—the milk bar in general. The man who uses non-fruit flavours, or flavours which are other than the finest pure fruit products, is a menace to the entire trade.

A true fruit flavour is, then, an essential of a good milk shake, and obviously a good milk shake is an essential of a good milk bar. But trueness of fruit flavour is not the only matter to be considered in regard to a milk shake. The basic fruit flavour may be present—it is present, very notably, in certain strawberry preparations otherwise not quite satisfactory—but the effect in milk may be more or less imperfect. There may be, and often is, a certain sickliness due to excessive sweetness. It is noticeable in some diluted fruit preparations as used in the make-up of soda fountain "fancies." A perfect milk shake requires, besides a fundamentally true fruit flavour, a certain acidity. Furthermore, such acidity, if adequate without being excessive, emphasises still more the basic fruit flavour.

Non-Curdling Syrups

This, however, at first presented a problem, for, of course, the phenomenon of curdling was involved. Considerable work along carefully thought out lines has resulted in the production of fruit syrups which, while imparting a desirable acidity, do not curdle milk, and are sufficiently sweet without being excessively so. Many such syrups are now easily available, and are eminently suitable for milk shakes.

The composition of most fruit-flavoured shakes is usually given as follows: 7 oz. cold milk (temperature about 40° F.), ¾ oz. syrup, and one 40-to-the-quart portion of ice-cream, the whole being aerated in the mixer (run for some twenty seconds) to a volume of about half a pint. These proportions are excellent for some syrups, including some of the finest, but not for all, among which are some of equally good quality. As an example, cer-

tain fruit concentrates of outstanding merit may be used to flavour a syrup of which the composition would be approximately as given below, and of this syrup rather more than one fluid ounce would be required for addition to 7 oz. of milk.

Fruit-flavoured Syrup

Simple syrup, 37·5° Tw.	2 qts.
Citric acid solution (50 per cent.) ..	¾ fl. oz.
Pure fruit flavour (concentrate) ..	4 ,, ,,
Liquid benzoic preservative ..	¼ ,, ,,

Colour as required.

In passing, it may be as well to emphasise that syrups flavoured with pure fruit juices possess the particular fruit vitamins, so that a milk shake prepared from them must be a most valuable food besides being a delightful beverage. The point is worth noting for publicity purposes.

One of the most attractive drinks served at a milk bar, and one which will probably prove increasingly popular as more people make its acquaintance, is the chocolate shake. Given a fine-flavoured syrup—and should not all chocolate syrup, by the way, include a little pure vanilla?—a well-mixed chocolate shake, properly chilled, is delicious. Coffee, as a flavour for milk shakes, is in the writer's opinion less successful, as a rule. Certain coffee preparations, though good for some purposes, are not sufficiently good for the flavouring of milk shakes.

Varied Flavours

Lime-flavoured shakes are selling very well at some London bars; they have a refreshing "bite" and a subtle charm of flavour which is very attractive. Orange shakes, and perhaps one or two orange combinations (orange-pineapple, for instance), are in demand, and lemon, of course, is a flavour with steady popularity. Strawberry may be very good—one certainly cannot agree with the opinion that it is not successful as a flavour for milk shakes—but the very delicate flavour is not easy to capture, and strawberry shakes vary, more so than some others, with the flavouring medium used. Raspberry, blackcurrant, cherry, and a few others find places among the steady sellers. Sloe has possibilities; so, too, has elderberry flavour.

Whey as a beverage is nothing new, of course—does not the immortal Pepys refer to his visits to the "wheyhouse" or wheyshop?—but the vogue of the milk bar has recently revived a practically extinct interest in this drink. It has quite a sale in some milk bars, and there are those who drink it regularly, as served from a proprietary preparation.

There is more than one malted milk product on the market, and no milk bar can afford to be without the means of serving a malted milk shake. It commands a steady sale all the year round.

Novelty Shakes

A word with regard to the importance of introducing novelty. It may easily be possible to go too far in the matter of a milk shake menu, with the result that too many flavours become "passengers". On the other hand, there must be ample variety, and the milk-bar habitué, especially, will certainly expect to find an occasional novelty, or what he thinks is a novelty, available. A little prudent experimenting may give the clue to a new shake which, given a fair chance, might prove unusually successful. The chance should, of course, be provided via the medium of the "daily special". Experience has shown that the daily special, whatever it may be, will sell better than any other shake on the day when it is made a "special". Here is the opportunity for a novelty try-out. Feature it as a special, and it will certainly be tried. Occasional reintroduction, at suitable intervals, might eventually establish it among the favourites.

DENSITY HYDROMETERS for USE in MILK

A SPECIFICATION for density hydrometers for use in milk has just been published by the British Standards Institution. The specification covers hydrometers of a range 1·025 g./ml. to 1·035 g./ml for use in normal milk. It also deals with hydrometers of a range 1·015 g./ml. to 1·025 g./ml. for use in milks of low density.

The basis of adjustment adopted for these hydrometers is that they shall indicate density—*i.e.*, mass per unit volume, in grammes per millilitre, at 20° C. in a liquid having a surface tension of 46 dynes per cm.—a mean value for the surface tension of milk. This is a departure from the customary practice of using hydrometers for testing milk adjusted to indicate specific gravity S60° F./60° F. at 60° F. Density has been adopted in preference to specific gravity because it affords a more satisfactory basis for hydrometry than specific gravity and because it brings the hydrometers into line with the British Standard Specification for Density Hydrometers No. 718, 1936, in which specification the advantages of a density basis are set forth in detail.

The temperature 20° C. has been adopted because this temperature is being more and more widely used as the standard temperature of adjustment for scientific and industrial apparatus. It has been adopted by the British Standards Institution as the standard temperature for volumetric glassware, for hydrometers, and for gauges used in engineering. Moreover, 20° C., for reasons given in the specification, has advantages over 60° F. as a temperature at which to determine the density of milk.

Tables are given for computing volumes of known weights of milk and *vice versa*.

In view of the importance of accurate hydrometers being used for the determination of the density of milk, the use of hydrometers tested at the National Physical Laboratory and found to comply with the British Standard Specification is strongly recommended.

Copies of this British Standard (No. 734, 1937) may be obtained from the Publications Department, British Standards Institution, 28, Victoria Street, London, S.W. 1, price 3s. 10d. post free.

ECONOMICAL MILK COOLING

THE largest cooling tunnel installation of its type in this country, at the Walsall and District Co-operative Society's Dairy, has just been completed by L.C. Engineering Supplies, Ltd.

This plant consists of two tunnels, side by side, each tunnel being 72 ft. 6 in. long overall by 5 ft. wide overall, and has a capacity to cool 80 1-pint bottles of sterilised milk per minute, for a 55 minutes' cool (600 gal. per hour). The plant, cooling 600 gal. of milk per hour, is only using some 80 gal. of water per hour, whereas in most methods of cooling many hundreds of gallons of water would be required to cool this quantity of milk.

The machine not only cools, but conveys the cans or bottles to the store, washing them *en route*, hence performing a triple duty.

LETTERS to the EDITOR

COPPER IN TOMATO PUREE

SIR,—I have read with interest the letter by "Public Analyst" with regard to the amount of copper in tomato purée. According to Lindow, Elvehjen and Peterson (*J. Bio. Chem.*, 1929, vol. 82, 465), amounts of copper up to 0·6 parts per million have been found to occur naturally in tomatoes. I myself have never found more than 2 parts per million in any tomatoes examined, but the figure of 5 parts per million was taken on the authority of the Chief Medical Officer of Health himself, who states amounts as high as 5 parts per million may be present. Any legislation should, surely, cover the maximum which is likely to occur naturally, and to this an amount which might be accumulated during manufacture under well-controlled conditions should be added. On this basis, the recommended figure of 25 parts per million is not excessive, and considering the small quantities of tomato products usually consumed at a meal, there would not be the slightest toxic effect from this amount. As 25 parts per million is not toxic, and the amount found does not indicate any careless processing, surely this would be a reasonable basis for a legal limit.

I am, Sir,
Yours faithfully,
AUTHOR.

June 16, 1937.

SIR,—In last April's number of FOOD MANUFACTURE has appeared an article on tomato purée which contains the statement that "such terms as 'double concentrated', 'treble concentrated', etc., are really meaningless".

As far as French canned tomato purées are concerned this statement should be corrected, since terms such as those cited above are legally enforced in this country, and products bearing them have to comply with precise and rigidly controlled requirements as regards the minimum dry matter content.

The "Décret du 15 Septembre 1932" established the following minimum dry matter contents:

Purée, pulpe or sauce	7	per cent.
,, or conserve mi-réduite	10	,,
,, réduite or concentrée	15	,,
,, double concentrée or extrait ...	30	,,
,, triple concentrée	45	,,

It is further stated that the percentage of dry matter has to be understood *exclusive* of any added salt, whose amount shall not in any way exceed 5 per cent. The use of terms other than those listed above is permitted, provided they be immediately followed by the statement of the dry matter content, exclusive of added salt.

As regards the factory control of the degree of concentration, I might add to the details given by your correspondent that the majority of French packers use a direct reading refractomer, specially constructed for tomato purées, giving the dry matter percentage without the use of tables.

Yours faithfully,
H. CHEFTEL,
ETABLISSEMENT J. J. CARNAUD.

Laboratoire de Recherches Biologiques,
71, Avenue Edouard-Vaillant,
Boulogne-Billancourt.

PARIS, *April* 23, 1937.

AROUND THE INDUSTRY

Scientist Cooks Food by Wireless, in Ice

Wireless short waves may soon be used for cooking food in ice. At least this is what seems to be indicated as a result of the lecture given recently in Vienna by Professor Kovarczik, the famous Austrian physicist.

The Professor gave practical proofs of his assertion.

In a large basin of water, reduced to the lowest temperature at which it would remain liquid, he plunged several large fish, all alive.

A button was pressed, and in a few minutes the fish were dead and perfectly cooked—with the water still at freezing point.

He then put a large piece of raw beefsteak into water and froze it into a cake of ice.

When the wireless waves had been turned on, the beefsteak was cooked to a turn—inside the block of ice.

Canning the Mango

India's most famous fruit, the mango, is to be canned in a suburb of Bombay.

Machinery is being installed, and orders for 1,500,000 tins have been placed in England. Half a million have already arrived.

Technical supervision of the canning will be in the hands of an Indian expert who gained his experience in the United States.

Plans are being made to market the product in the United Kingdom.

Miss Janet Bond

Miss Janet Bond, head of the recently formed Canned Foods Advisory Bureau, now announces that she will have her permanent headquarters at 243, Regent Street, London, W. 1.

She proposes to give information and guidance on the use of canned foods of all types, to the trade and to the public.

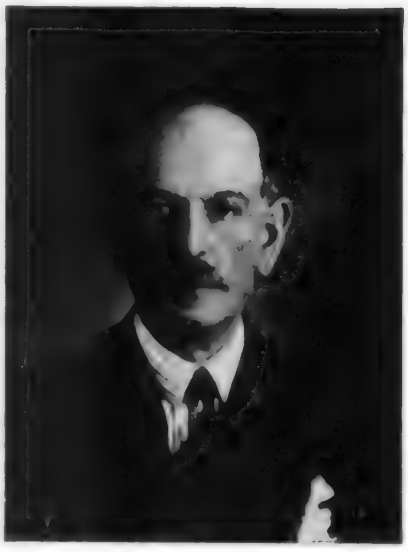
Diary

July 2-11. Achema VIII Chemical Engineering Exhibition, Frankfurt-on-Main.

July 8. Society of Chemical Industry, Food Group. Annual Meeting, Symposium on Fruit Juices, Harrogate.

July 12-17. Health Congress, Birmingham, organised by the Royal Sanitary Institute. Health Exhibition in Bingley Hall.

OBITUARY



Mr. Albert Schwarz

It is with deep regret that we announce the death of Mr. Albert Schwarz, a director of Polak and Schwarz, Bois-Colombes (Seine), France. Mr. Schwarz passed away at his home at Asinères on May 22, aged 67; he had the distinction of Industriel Chevalier de la Légion d'Honneur, and had played an important part in building up and consolidating the international reputation which his firm has for essential oils, flavouring and colouring materials. Besides branches in Holland, France, Germany and U.S.A., this concern is represented in England by Polak and Schwarz (England), Ltd.

Mr. Charles H. Palmer

We regret to announce the death of Mr. Charles H. Palmer, a director of Huntley and Palmers. Mr. Palmer died at his home, Bozedown House, Whipchurch, near Reading; he was the second son of the late Mr. Samuel Palmer, one of the three brothers who created the biscuit firm. His son, Mr. C. Eric Palmer, is the present chairman of the board.

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Empire Exhibition, Scotland, 1938

An Exhibitor's handbook has now been issued, giving full details of stand space available, and regulations to which exhibitors will be subject. It is understood that much space has already been reserved by commercial firms and official bodies.

Director of W. J. Bush in U.S.A.

Mr. H. Brinsley Bush, director of W. J. Bush and Co., Ltd., London, is on a visit to the United States, partly on business and partly for pleasure, we understand. After spending a few days in New York, Mr. Bush left for the Pacific coast and is making his headquarters with W. J. Bush Citrus Products Co., Inc., in California.

Higher Pay for Food Workers?

The Sugar, Confectionery and Food Preserving Trade Board have agreed to propose an increase in minimum wages.

The proposal, which affects some 85,000 workers, would raise the wages of men by 1d. an hour, and of women by ½d. per hour. Increases of smaller amounts are proposed for other workers.

Condensed Milk and Biscuits for Wales

A factory for making condensed milk is to be erected on land near the present cheese factory and milk distributing centre at the village of Ffairfach, near Llandilo, Carmarthenshire.

Work is to be begun on the new factory immediately, and it is expected to provide work for over a hundred people. Mr. R. B. David, of Carmarthen, has been appointed manager.

Work is to commence almost immediately on the erection of a biscuit factory, employing 350 men and girls, at Llantarnam, Monmouthshire. The factory is one of 34 which are to be erected in different parts of the country, and the Llantarnam site, occupying a triangular piece of land about two acres in extent, is considered to be the best of the 34 locations. Production is expected to be in full swing by the end of the year.

Mr. S. R. P. Jones

Mr. S. R. P. Jones has been appointed to the position of Works Manager of George Adlam and Sons, Ltd., brewers' and general engineers. Mr. Jones is a member of the Works Management Association.

Rising Cocoa Prices—Shortage Likely

After a period of nearly five years at almost ruinous prices to the producers, the past nine months have seen rapidly rising values. During the years of low prices the chocolate manufacturers created a much larger public demand, says *The Times Trade and Engineering Review* (May).

The biggest single producing country is the Gold Coast, which supplies over one-third of the world's requirements. The world's production for the current season is estimated at 640,000 tons, and there have been no signs of any slackening in demand, despite the higher prices, and the United States consumption is believed to be still steadily increasing. It seems certain, therefore, that production will fall short of consumption by some 40,000 to 50,000 tons. The United Kingdom consumption during 1936 was a high record at 102,146 tons, against 82,429 tons in 1935.

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B.S.S. for Viscosity

The British Standard Method for the Determination of Viscosity of Liquids in Absolute (C.G.S.) Units has just been revised and brought up to date. Much useful information on the measurement of viscosity in industrial fluids is given, embracing emulsions, suspensions and colloidal solutions. The Specification is No. 188, 1937, and may be had from the Publications Department, British Standards Institution, 28, Victoria Street, London, S.W. 1, price 2s. 2d. post free.

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Heinz Extend

We understand that extensions are to be added to the Bristol headquarters of H. J. Heinz and Co. It is expected that present accommodation will be practically doubled by the programme of alteration and reconstruction. When complete the new buildings will afford a floor space of between 15,000 and 16,000 square feet and will have their own railway siding.

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Pressure Control

A leaflet has been issued by the Cambridge Instrument Co., Ltd., illustrating several types of pressure and draught indicators and recorders. Details are given of a very complete range of these instruments.

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Quality Inspection Lamp

A sensational paragraph in the popular Press recently announced that a new lamp had been discovered that showed up "invisible" fingerprints and alterations on documents. The true facts are that the principle of the lamp is by no means new, but fluorescence is finding wider applications in industry and commerce.

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Ultra-Violet Light

Hanovia, Ltd., of Slough, one of the pioneer ultra-violet equipment firms in this country, have just placed on the market a very useful, portable analytic lamp. The principle of this lamp is that different materials, when viewed by its light, fluorescence differently, although in normal light they may be indistinguishable.

Thus it is possible to differentiate at a glance butter from margarine; cream from reconstituents; lard from white grease; wheat flour from other flours; new laid eggs from stale; vinegar from acetic acid; virgin olive oil from extracts. It is also a simple matter to detect the presence of added preservatives, adulterants, or to inspect for substitution or decomposition.

The advantage of being able to subject all raw and finished materials to a thorough, rigid inspection in the works will be readily appreciated. Of even more importance is the fact that the test is an instantaneous inspection one; it does not require the use of any tables or formulæ, and in many cases saves long and intricate chemical tests in the laboratory.

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New Market for Cider Makers?

A report from a correspondent in Czecho-Slovakia tells us that apple juice is now used experimentally as a tempering bath in iron and steel foundries. The juice replaces oil which has to be imported, and the idea is, therefore, attractive to Czecho-Slovakian metallurgists. We wonder if it will be necessary to ask the workmen to "sign the pledge" before leaving them in charge of a tank of cider?

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Morton's New Pack

An unusual pack has just been placed on the market by C. and E. Morton, and represents their latest line for the Home Trade market. The carton is in the form of half a cube (cut diagonally) and contains a new table sweet, "Milk Shape". This product has the approval of the Milk Marketing Board, and it is claimed that the shape of the pack lends itself to counter and window displays.

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Chinese Liquid Eggs

The Import Duties Advisory Committee have decided that the Chinese are not to be asked any more than the present rate of one halfpenny per lb. on their shipments of liquid eggs to this country.

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New Range of Thermo Metals

The use of thermostatic devices is now being developed on a wide scale, and the need for metals which respond to temperature changes is growing correspondingly. The uses to which these devices are applied are, indeed, so varied that a large number of different combinations of metals is essential.

In order to meet the varied requirements of users on this side of the Atlantic, Henry Wiggin and Co., Ltd., has made arrangements with the H. A. Wilson Company of Newark, N.J., to handle this latter company's full range of thermostatic metals in Europe. In the first instance, Wiggin's supplies will be drawn from New Jersey, but in due course the complete range will be rolled at their Birmingham works.

Having sent representatives to America for the purpose, Henry Wiggin and Co., Ltd., are now able to give advice as to the ways in which thermostatic control can be adapted with advantage in any particular circumstances, or as to the best type of Thermo-metal to use for any given purpose. Readers at present using such devices or wishing to consider their adoption are cordially invited to make full use of the help which Henry Wiggin and Co., Ltd., are prepared to give.

New American Barrel

National Steel Barrel, 3850 East Ninety-First Street, Cleveland, Ohio, has just introduced a line of 5-gal. pails equipped with the company's patent easy-to-open, tight-sealing, Quik-Lox rings that offer many advantages to manufacturers for transporting bulk solid, semi-solid, and liquid materials. New pails are easy to fill, as the ring enables the entire

(With Acknowledgements to "Chemical Industries," U.S.A.

head to be removed; risk of inaccurate filling or spillage is reduced. After filling, the gasket-like heads are replaced and the pails prepared for shipment by simply closing the quick-acting lever ring, thereby saving time and money on this operation. Spouts may be fitted to the pails if desired, and tamper-proof seals can also be applied.

Snails in Cans

A factory has been built in Bosnia for tinning snails, tortoise, and frogs' legs.

In recent years a large export trade in these delicacies from Bosnia to France and Italy has been built up, but (says Reuter's Belgrade correspondent) it has been found that they are often ruined in transit. Now they are to be canned on the spot.

Internal Factory Transport

The Revvo Castor Co., Ltd., specialise in the manufacture of ball-bearing castors and wheels, and their new catalogue includes a pattern for every need. These castors are eminently suitable for fitting to trays and trolleys for the easy transport of goods within the factory from one department to another or along benches.

Metal Box Company Produce own Catalogue

Nobody can say that the Metal Box Company do not practise what they preach. Their new catalogue, a truly impressive production throughout, has a metal cover and metal spiral binding. The whole job has been planned and printed by them, and apart from its value as a catalogue, the book is an outstanding example of good layout and typography.

Examples are shown of up-to-date containers for confectionery, biscuits, cakes, and many kinds of foodstuffs and beverages. The list of important manufacturers served by this company is an imposing one.

"Eupax Pars"

This is the title of the bright little house organ of William Sessions, Ltd., The Ebor Press, York, printers of embossed seals and labels. This monthly magazine is now in its eighth volume, and its contents are a mixture of shrewd comments on serious business matters, leavened with paragraphs in a lighter vein, such as this:

Asked by her teacher what she thought the word "nonsense" meant, a little girl replied, "Nonsense is when an elephant is hanging over a cliff with its tail tied to a daisy."

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Two new catalogues issued by the Riley Stoker Co., Ltd., describe the Robot Stoker for central heating and small industrial boilers, and the Riley Class B Stoker for flue type boilers. Both stokers operate on the "underfeed" system, a highly efficient method claiming smokeless combustion, in which the hydro-carbons are distilled below the hot incandescent zone, and completely consumed in the combustion chamber.

Operating characteristics are included in the catalogues, which should prove useful to executives interested in boilerhouse efficiency.

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A. Gallenkamp and Co., Ltd., send us particulars of the "Technico" universal torsion viscometer. A metal cylinder is suspended, in a sample of the liquid to be tested, by means of a torsion wire. The distance through which the cylinder revolves as a result of a known amount of torsion is measured on a scale, and this figure is taken as the measurement of viscosity.

Need for Export

This is the title of a book published by the Institute of Export at 8s. 6d. The book comprises the three winning papers chosen in open competition by the Institute. Authors are Mr. G. Wilson, M.I.Ex., Mr. A. Kunzler, M.I.Ex., and Mr. E. Hebblethwaite, M.I.Ex., and the foreword is by the Lord Mayor of London.

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The Howard Rotary Pump Co., Ltd., is now incorporated, and in future all business connected with rotary pumps will be dealt with by the Howard Pneumatic Engineering Co., Ltd., at 36-38, Victoria Street, S.W. 1. The personnel of the two Companies will remain unchanged, and Messrs. Chas. E. Howard and G. E. Howard will continue to look after the Pump side of the business.

A new baking powder pack by Standard Brands, Ltd. The top and bottom of the carton are identical, so that there is no "upside down" position. Design by Metal Box Co., Ltd.

Vats and Wooden Tanks

Vats and wooden tanks made by Carty and Son, Ltd., can be supplied in any size from 50 gallons or less to 100,000 gallons or more; there are no standard sizes, each vessel being made to the specific shape and size required. The wood from which the vessels are manufactured is well seasoned and has been carefully examined for defects.

Everlasting Chocolate

A Brazilian confectioner claims to have made an "everlasting" chocolate. He says that normal ingredients are used, but his process is secret. It is claimed that the chocolate lasts as long as chewing gum, and finally melts away in the mouth. Chocolate manufacturers will be glad to hear that it *does* melt away eventually!

STORAGE and PRESERVATION

By FRANK GERRARD

THE INTRODUCTION of preservatives in sausages is almost prohibited, but it may be as well to dwell on the matter a little more fully. The Public Health Regulations (Preservatives in Foods) of 1925 governs all cases by setting out that the use of preservatives of any kind in certain foods, including meat, is forbidden, except that sausages and sausage meat containing raw meat, cereals, and condiments may contain sulphur dioxide in the proportion by weight of 450 parts in one million. This very small quantity works out to approximately 1 lb. per ton of sausage meat, and the difficulty experienced by the maker of small goods in weighing out the amounts correctly where the chopping is a small one practically prevents the using of preservatives altogether. Moreover, if preservatives are used, the sausages must bear a label printed in dark block type on a light ground, the letters to be not less than $\frac{1}{8}$ in. in height, and the whole to be surrounded by a dark line, as follows:

THESE SAUSAGES CONTAIN
PRESERVATIVES

Where the sausages or sausage meat are sold from the shop directly over the counter, the notice may be placed in a conspicuous position in the shop itself, but if the sausages are delivered they, or the packet in which they are contained, must bear the notice.

The term preservatives is very misleading, for the regulations lay down that it means any substance which is capable of inhibiting, retarding, or arresting the process of fermentation, acidification, or decomposition of food, or of masking any of the evidences of putrefaction. This would appear to exclude the use of certain common things which are known to possess these properties, such as ordinary common salt, but fortunately the order goes on to state the exceptions, and the following may be used with impunity: Common salt, saltpetre (both potassium and sodium nitrate), sugars, lactic and acetic acids (vinegar), glycerine, alcohol, herbs, hop extract, and, most important of all from the view of the small goods trader, spices and essential oils for flavouring or any substance added by the process of curing known as smoking. It is curious to note that the use of nitrite is forbidden, for in the using of brine the full and proper effects are not obtained until the nitrate (the use of which is permitted) has by chemical action been converted partly into nitrite, and it would appear that if the use of the latter were permitted, with safeguards as to the quantity, the action of the brine could be speeded up and the necessity for waiting for the brine to mature would be obviated.

This, then, being the position, how can the maker of smalls ensure the keeping properties of his goods? Well, there are several ways that can help. The growth of the organisms causing putrefaction is aided by temperature and humidity, and attention to these two factors will help us. Careful management and handling throughout the process, too, will give its reward. Buy and use sound meat; never sink to the level of the trader who considers the sausage the natural outlet for meat that is, shall we say, not too fresh. Use clean knives, machine, benches, etc., in the preparation, and cool the meat before machining. If bread is used for binder see that none of it is suffering from mould growth and, if rusks are employed, make sure that they are sterile. Attention to the skins will be well repaid. The cheapest skins in the long run are those for which you pay the best prices—second quality skins are apt to go grey rapidly and the meat appears bleached. However, if the sale is a quick one and the cheaper skins are used, the latter disadvantage can be overcome by introducing a little colouring matter to the pack. The dryness of the skin, too, is of importance, not only with regard to the appearance of the produce. Finally, it is a good plan to cool the sausages before delivery, and then see that delivery is carried out as expeditiously as possible. Should there be any doubt as to the freshness of the goods, cut open the sausage and pour over it hot water or lime water, for this will accentuate the odour beyond any possible shadow of doubt.

The Storage of Sausages

The question of the storage of manufactured sausages and of cooked meats is in reality rather a difficult one,

although with the advent of refrigeration traders are apt to imagine that it presents no undue difficulty. Small goods are most prone to attack by mould growth rather than by actual bacteria. Briefly, a mould is an organism capable of fairly rapid multiplication by the growth of spores, which are shed when ripe and drift about in the atmosphere until they find a suitable medium on which they can begin to sporulate. And thus the whole process begins once again. The rapidity of growth is dependent on the temperature and the humidity both of the atmosphere and of the article on which the mould settles. Thus, if these can be regulated and kept within bounds we have gone far on the road to the solution of the matter. Certain moulds will derive the necessary moisture from the atmosphere, while others, again, will withdraw moisture from the actual goods themselves. One way, then, of reducing the likelihood of mould damage is to have the goods wrapped, and this method will also be found to reduce the amount of sweating which takes place on removing the sausages from the store.

Generally speaking, it is preferable to have a fairly low humidity in the actual box, although the temperature does not need to be extremely low. A brisk circulation of the air is necessary to remove the surface moisture from the goods, but if the humidity be too low and the air circulation too brisk there will be considerable dehydration, and therefore great loss of weight in the sausages.

Modern-day refrigerators are very efficient and extremely reliable, but, even so, it is necessary to consider carefully the kind of refrigerant used, so that, in the event of a leakage occurring, the risk of contamination from the refrigerant coming in contact with the stored goods is reduced to the absolute minimum. In a hand-operated machine the best refrigerating medium is probably ammonia (NH_3). It works pressure in approximately 100 lb. to the square inch, so that in the event of a leak developing, the loss of the gas by leakage is greatly reduced—far less so than is the case if carbon dioxide be employed. This gas, moreover, is very soluble in water, and thus one has at hand a simple and easy method of finding where the leakage is occurring. For an automatically controlled machine methyl chloride (Ch_3Cl) is chiefly used. This gas, beside being as harmless as carbon dioxide (CO_2), has also a very low working pressure. In the case of a leak one does not search for it with water, as with the previous refrigerant, but makes use of a spirit flame, which is run along the pipe line. Where the gas is being given off the flame changes colour and gives a distinctive greenish light. In the United States a compound gas known as Freon is used in the automatically controlled machines. It has also a low-working pressure, and is harmless, but it does not yet appear to be much utilised on this side of the water. Exactly how the presence of these particular gases produces the required lowering of the temperature is the outcome of an application of one of the physical properties possessed by the gas family—namely, the one of rapidly adapting themselves to the pressure exerted upon them. Thus a given quantity of gas can be made to assume a very small or a very large space, according as the pressure is increased or diminished. But in the rapid expansion or contraction heat is absorbed or given out, and it is this factor which has brought about modern methods of refrigeration.

Value of Low Temperatures

The researches conducted by the Low Temperature Station at Cambridge show that with meat kept at a temperature of 32° F. the growth of bacteria was such that the multiplication reached a stage where the organisms coalesced and formed a slime not only visible but possessing an offensive smell, in a period of between 8 and 11 days. Meat kept at 39° to 40° produced sufficient organisms to form the slime in 4 to 5 days, while keeping the temperature at 68° produced the necessary conditions in one day. This affords clear proof of the value of low temperatures, but shows also that the micro-organisms are not destroyed, their power of proper functioning being merely slowed down. Even after making the degree of coldness to 20° F. (*i.e.*, 12° of frost) the organisms are encountered, although their growth is extremely slow.

The heating up of the material during sausage manufacture is a matter which requires attention, and it should be the aim of the individual concerned to keep the temperature low. That there is a definite rise during the process is shown by the figures given below. The manufacture and filling were carried out on a mincer with as little delay as possible, and 8 lb. of sausages were made.

Temperature of the room	52° F.
Internal temperature of the meat on removal from the cold store	34° F.
Temperature of the lean meat and the fat after the former had been twice through the machine and the fat once through the coarse plate	40·3° F.
Temperature after the seasoning and soaked rusk had been added	42·2° F.
Temperature after hand-mixing	44° F.

The meat was then put once more through the mincer and filling began.

Temperature of the first sausage	46° F.
Temperature of the second sausage ..	50·8° F.

Assuming the average temperature of the sausages produced to be 48°, this shows a rise of 14° F.; that is to say, about 80 B.Th.U. were absorbed during the process, or enough heat to boil $\frac{1}{8}$ pint of water.

How can this difficulty be minimised as far as possible? The following suggestions will probably be found useful:

Ascertain that your factory is properly laid out, that your cooking appliances are not adjacent to the preparing room or benches. Do not leave your meat too long out of the cold store before you begin to make use of it, for the temperature begins to rise as soon as the door is passed and in a fairly short period of time the rise is appreciable.

Left to Right:—Mr. C. B. Woodley, Dr. C. S. Garland, Mr. R. H. Stein, Mrs. J. Vargas Eyre, Sir Gilbert Morgan, and Dr. J. Vargas Eyre.
"Food Manufacture" photograph

PRESIDENT'S GARDEN PARTY

RESEARCH chemists of the Distillers Company, Ltd., are fortunate in that their laboratories are housed in so charming a venue as Epsom. This good fortune was shared by members of the London Section of the B.A.C. on June 19 when, at the invitation of Dr. and Mrs. J. Vargas Eyre, President of the B.A.C. and Director of the Research Laboratories, some 200 guests attended a reception and garden party.

Any thought that gatherings of scientific men are necessarily dull affairs was dispersed when, announced in stentorian tones by a major-domo and charmingly received by host and hostess, guests wandered along the terrace, admired the view, and fraternised with the chemists of the Distillers Company. Tea was quite up to the expectations raised at the sight of so many gaily coloured sunshades set o'er the tables, and digestion of good things was materially aided by the lively strains from a hidden band. A cheerful sight this, the degustation of confectioneries by chemists, and did they consume strawberries and cream?

This important function over, repleted groups were escorted by guides round the extensive building, commencing with the well-arranged library, the efficient layout of which aroused envy in the heart of more than one test-tube twirler. Bacteriological and analytical laboratories were models of what such labs. should be, and particularly interesting were those in which yeast extract and ergosterol preparations are dealt with. Seed yeast culture rooms, from which hail the parents sent to the factories, and the synthetics and catalytic process departments were displayed. Finally, came a visit to the huge experimental yeast production plant.

The fact that sherry and cocktails were being served on the terrace in no way detracted from the interest of this tour, but the cluster around the tables appeared to swell greatly as the tours ended! Glass in hand, Sir Gilbert Morgan, Past-President of the B.A.C., talked animatedly with R. H. Stein, Director of the D.C.L. and just fresh from a wedding. Dr. Vargas Eyre chatted happily to Dr. C. S. Garland, the B.A.C. Chairman, and moved, as did Mrs. Vargas Eyre, with cultured ease from guest to guest. We also noted E. S. Bertenshaw, Secretary of Customs and Excise, and Mr. and Mrs. Ballantyne, Director of Lever Bros., Ltd., enjoying themselves.

It speaks much for the iron discipline of chemists and scientists that they were able, at the proper time, to tear themselves away from so happy a function and leave behind much distillate, having nevertheless duly sampled the distillates with complete approval. The occasion called for acclamation for Dr. and Mrs. Vargas Eyre, and it was given.

Among those present were: Dr. and Mrs. W. Cullen (President of the Society of Chemical Engineers); Major and Mrs. Lathbury (Home Office); F. Redfern and Mrs. Redfern (Director of D.C.L.); J. P. Lawrie and Mrs. Lawrie (*Manufacturing Chemist*); C. B. W. Woodley (General Secretary, B.A.C.); P. D. Wright and Mrs. Wright (B.I.S.); H. S. Sarson and Mrs. Sarson (Director, British Vinegars, Ltd.); J. B. P. Harrison and Mrs. Harrison (Vice-President, B.A.C.); T. Crosbie-Walsh (FOOD MANUFACTURE); Miss W. Wright (Vice-Chairman of Council, B.A.C.); H. H. Woolveridge and Mrs. Woolveridge (Director, Honeywill and Stein); G. T. Gurr and Mrs. Gurr (Chairman, London Section B.A.C.); and Dr. and Mrs. E. F. Armstrong (Past-President, B.A.C.).

THIS MONTH'S NEW BOOKS

Milk Products

Milk products are manufactured by processes which involve engineering, physics, chemistry, and bacteriology. The end in view is to provide material of nutritional value to the community. A modern book on milk products should deal with these sections with the proper sense of proportion and give adequate information on variety, composition, storage properties, and nutritional value. Milk products mean much not only to people whose prosperity depends on their manufacture but to the community into whose dietary they so largely enter. Due attention should therefore be paid to the present-day efforts which are being made to standardise, improve the quality, and increase the consumption of milk products under highly specialised and competitive manufacturing conditions, and the treatment should cover at least the latest research in the more important branches of dairy science.

This new book is claimed to be "a practical handbook which attempts to set out in reasonably concise form the various ancillary uses to which milk may be put, and to describe the processes of manufacture, together with desirable methods of control." The authors are respectively the medical officer of health and sanitary inspector of a London borough, and it is interesting to follow their treatment of the subject. The book may be regarded as a companion volume to *Milk: Production and Control*, by the same authors and publishers.

The treatment is comprehensive; every major and minor product and by-product of milk is described to some extent. To the food manufacturer the book will be useful as a reference to what milk products are available for further incorporation into foods, their composition and previous treatment. To the food chemist, the treatment naturally suffers from drawbacks which a book claiming this scope in so short a length must needs possess. The description of composition and variations in composition, chemistry, and physics of manufacturing processes (where given), and the chemistry of ripening and storage is far from being complete. The sections on faults in various products show not only the absence of first-hand practical knowledge of the products and of the behaviour of food constituents generally but also the overlooking of the latest conceptions of the mechanisms of the developments of some faults. To readers already cognisant with this branch of dairy chemistry, the treatment is a tiresome reiteration of general and often erroneous speculations which have appeared in a sequence of books during the last twenty years. The analyst will find that although a large number of methods of analysis of each product is given there is no indication of the accuracy or preference of one method when compared with another, and no reference is made to recently standardised methods of analysis.

The food bacteriologist will find a comprehensive list of micro-organisms both of the food-spoiling and the pathogenic types which are found in nearly all dairy products. Evidence of the finding of harmful micro-organisms is reported voluminously. The importance of this principle of "pathogenophobia" is overdone, and the general reader is apt to gain a wrong impression of the hygienic quality of milk products. More attention should have been given to the usefulness of bacteria; the biochemistry of cheese making and ripening, and the development of aroma in butter should have had fuller treatment.

The engineer is well catered for; the book is profusely illustrated with over seventy reproduced photographs and line drawings of manufacturing plant and of process charts. Food regulations and standards are treated fully. Many of the Regulations under the Public Health and Foods and Drugs (Adulteration) Acts are reproduced *verbatim*.

The chapter on Dried Milk is well illustrated and written, but the importance of solubility and its methods of determination need to be revised.

The macronutrition of milk products (calorific values, etc.) is given fairly fully, but micronutrition, especially the vitamins, is described scantily and is not up to date.

There is a subject index. There is no author index, and no references either in the preface or in the text from where the authors have obtained their information.

W. L. D.

Milk Products. W. Clunie Harvey and H. Hill. London. 1937. *Pp. viii + 387. Price 15s. nett.*

Chatham House

Commander Stephen King-Hall has been kind enough to send us a presentation copy of his book on the work of Chatham House. It houses the Royal Institute of International Affairs, which exists to encourage and facilitate the scientific study of international questions and to provide and maintain a means of information on international affairs. Chatham House can be said to have broken new ground in the first of these objects. It is, however, the second which might reasonably be said to interest the readers of FOOD MANUFACTURE.

The average business man, or, for that matter, man of affairs, finds it extremely difficult to keep abreast of world developments, to know how they affect him, or, in fact, to know where to find information when stern necessity appears to make this information essential to him. Chatham House is available to all. Commander King-Hall says in his opening chapter:

"I have ample evidence in the shape of thousands of letters received from all parts of the kingdom in connection with my work of the unslakable thirst for knowledge about international political, economic, and social problems which exists to an increasing degree amongst all sections of the community. This phenomenon is considered by all who, either through the Press, radio, or publications, serve public opinion, to be one of the most remarkable and significant of the changes between pre-war and post-war times. It has called into being a new profession—that of the commentator, expositor, or 'populariser' . . . and without Chatham House such persons, as well as the great body of journalists, broadcasters, professors, and teachers whose business it is to interpret current events to the people, would be at a loss to turn for the information they need."

The book contains an appeal for the endowment fund to allow for an expansion programme. Manufacturers might do well to consider some form of co-operation from the selfish point of view if for no other.

Chatham House. By Commander Stephen King-Hall. 5s.

Proceedings of the Chemical Engineering Group

Vol. 18 of the Proceedings of this section of the Society of Chemical Industry is well presented and contains nineteen papers, read during 1936, covering a wide variety of subjects which include the use of liquid chlorine, safe road surfaces, filter presses, acid-resisting filters, automatic regulators, and aviation. The book makes a valuable addition to the shelves of chemical engineers, chemists, engineers, works managers, and others.

Chemical Engineering Group Proceedings. Vol. 18. 1936. 21s.

The RIPENING of MEAT

By T. CROSBIE-WALSH, F.I.C.

THAT MOULD and bacterial growth can be controlled by radiations at temperatures up to 56° F. and a relative humidity of 90 to 100 per cent., thus reducing shrinkage and trimming losses, is indicated by tests on the use of ultra-violet rays for controlling bacterial growth carried out for Beinecke-Ottman Co. at the Merchants Refrigerating Co. This according to a report put out by the Westinghouse Lamp Co. and presented by Mr. G. A. Home to the Institute of American Meat Packers.

Reduction of Time

The ripening process is reduced to 3 to 5 days due to high temperature and high humidity conditions. The meat may be kept at a temperature of 34° F. for several weeks before marketing. It is claimed that there is a saving in refrigerating costs due to increasing the temperature of the hanging room from 35° to 56° F., and a saving of space due to increase of the possible rate of stock turnover.

Dr. Ewell, commenting upon the tests, expressed as his opinion that further experimentation was needed, as the results were not entirely concordant. Also that the ripening (or "tendering") of the meat by the means described involve some loss in bloom. He adds that this may be eliminated by slight trimming.

Mr. Chamberlain, General Manager of the Beinecke-Ottman Co., agrees with the ripening effects of ultra-violet rays, but remarks that artificially ripened meat cannot be held more than 3 or 4 days at 34° F. It will be seen that there is a serious difference of opinion as to the length of time "tenderised" meat can be subsequently kept at the lower temperatures. Mr. Chamberlain is also of the opinion that radiation has no practical use in the average meat packing plant.

He suggests its practicability is where the large chain store butcher has his own commissary and could ripen meat just prior to time of sending supplies to individual stores.

Two papers by Dr. A. W. Ewell were also mentioned. In the first one he reviews the work of Dr. Schmidt and his associates at the Karlsruhe Laboratories, which deals exhaustively with the effect of temperature and humidity upon bacterial and mould growths. Details are given of the multiplication of bacteria and moulds at specified humidities. Stress is laid upon the greater danger from mould than from bacterial growths. Ewell tabulates various methods of checking mould and bacteria by humidity control, air motion, carbon dioxide, and ozone. He devotes most of his paper to a discussion of German experiments on the effect of ozone in meat chambers. Ozone, at a concentration of 1·7 parts per million, reduced the bacterial and mould content of the air to a very large degree.

Ozone

The percentage of ozone in the air of the chambers proved a very important factor. If the concentration is too low the preservative effect is almost nil. Too high a concentration or too long duration of action produced rancidity of the fat of the meat. It is considered that there is sufficient evidence in favour of the use of ozone in connection with the preservation of meat during ripening to warrant further study, especially with cuts of meat.

Quick Freezing

Papers by Tressler, Birdseye and Murray were also reviewed. These were mainly concerned with the relative tenderness of chilled and quick-frozen beef.

An outstanding item is that of the tendering of quick-frozen meat during subsequent cold storage. It is generally conceded by the majority of experimenters that the tendering effect of meat at temperatures above freezing is due to the action of enzymes. The authors liken the effect of quick-freezing meat to that of the well-known device of hammering it. In some experiments cited, steaks showed a marked increase of tenderness during five weeks of storage at 20° F. after having been quick-frozen. The question is asked, "What causes this increase after rapid freezing?" It is a particularly interesting one in view of the statement of what is said in the British Food Investigation Board's Special Report No. 36. "The rate at which these reactions (enzymic) proceed is dependent on the temperature—during storage below freezing point the reactions are almost completely inhibited" (T. Moran and E. C. Smith).

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For those desiring to consult the original publications a list is appended:

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British Food Investigation Special Report, No. 36.

Post-Mortem Changes in Animal Tissues: The Conditioning or Ripening of Beef. By T. Moran and E. C. Smith.

MACHINE-MADE LEMON OIL

THE mechanisation of the Italian citrus industry has gone another step forward with the introduction of the Ramini machine for the production of lemon oil. This new machine was described and illustrated in *Rivista Italiana delle Essenze, dei Profumi, e delle Piante Officinali* recently, and the quality of the essential oil produced approximates that of "sponge" oil. The feature of the Ramini machine is a rotating horizontal disc and fixed helicoidal disc, the latter being set at 30 mm. and 80 mm., at two given points, above the lower horizontal disc. Between these discs the lemon peel is gently squeezed and rubbed on itself, an action which is similar to its treatment by the sponge process.

The essential oil is collected in water, from which it is removed by decantation, and the period of contact between water and oil having been cut down to a minimum, the oil undergoes little change and is similar to the sponge oil. Analysis of samples of oil from two batches of lemons, some of each being treated by the Ramini machine and by the sponge process, gave the following data:

	Batch I.		*Batch* II.	
	Sponge process.	*Ramini machine*	*Sponge process.*	*Ramini machine.*
Specific gravity	0·8571	0·8555	0·8585	0·8569
Optical rotation	+64·60	+64·70	+61·30	+61·40
Refractive index	1·4750	1·4746	1·4749	1·4746
Citral (per cent.)	4·60	4·40	4·40	4·20
Fixed residue (water-bath) (per cent.)	2·30	2·10	2·40	2·20

The working of the machine is simple; the peel is loaded into a hopper, from where it drops vertically on to a distributing plate that feeds it laterally on to the rotating disc. The peel is carried against the stationary helicoidal disc, which can be adjusted according to the pressure necessary or the condition of the peel. Water in a fine spray washes the essential oil liberated from the peel into a trough, from where it runs into a settling tank. Here it floats on the surface of the water, and is removed from time to time; the water is pumped back continuously to the sprays. The machine is self-contained, and is driven by a 1 h.p. motor geared down.—*Pharmaceutical Journal*, May 22, 1937.

DETERMINATION of COBALT

THE increasing use of cobalt as a surfacing metal for steam-heated and other pans (it is claimed that cobalt is more resistant to corrosion, attack by juices, etc.) gives interest to new methods for the determination of cobalt described in a paper by B. S. Evans, *Analyst*, **62**, 363. A volumetric method described closely resembles the ordinary nickel titration. A method is described for titrating nickel in the presence of cobalt, and a new method of separating cobalt from metals interfering with the volumetric procedure has been detailed.

CARBON DIOXIDE in REFRIGERATION

BRITISH authorities hold that, although the present gas storage does not dispose of the necessity for refrigeration, serious spoilage is overcome, write J. J. Vollertsen and A. D. Rich, *Ind. Eng. Chem.*, **29**, 5, 485. Beneficial effects of an incidental nature also result in the way of improvement in muscle meat colour and stability and colour of the fat.

The commercial procedure employed is briefly as follows: Immediately upon completion of stowage, the chambers holding the meat are sealed and the gas is turned on. As close as possible to 10 per cent. of the volume is introduced and maintained during the voyage. This requires occasional replenishment, depending upon the tightness of the equipment, temperature conditions, etc. Percentages between 8 and 11 are recommended. High concentrations will discolour (gas stain) beef, while low ones are ineffective. The percentage is lowered to 5 about 2 days before discharging the cargo because a 10 per cent. concentration has been found dangerous to the workers.

An interesting feature in connection with the method is that, in calculating the proper charge of gas, it is necessary to include an amount that will be absorbed by the meat. This equals about one-third pound of gas per ton of product and is an important item when determining costs.

DETERMINATION of SULPHITES in the PRESENCE of NITRATES and NITRITES*

IN the examination of "meat pickles" consisting of meat juices in association with brine and potassium nitrate and nitrite, the author found that by the Monier-Williams process, no sulphur dioxide could be recovered, and the problem of interference by the nitrate and nitrite was solved by the use of hydrazine sulphate in alkaline solution.

Five gm. of hydrazine sulphate are dissolved in 100 ml. of hot water and transferred to a flask fitted with top funnel, reflux condenser, and delivery tube arranged as employed in the Monier-Williams process. The liquid is boiled to expel air, and cooled in a current of CO_2. Twenty ml. of a 20 per cent. solution of NaOH are added through the top funnel, and the flask is thoroughly shaken. The caustic soda is followed by a suitable quantity of the liquid (or suspension of solid) to be tested, and the contents boiled in a current of CO_2 for 5 minutes. The flame is removed from the flask, and 10 ml. of phosphoric acid (sp. gr. 1·75) and a small quantity of pumice added through the top funnel. The flask is boiled in a current of CO_2, and the SO_2 distilled and collected in H_2O_2 in the usual manner. In applying this process to brine and meat pickles, it is desirable to dilute the reduced solution with boiled distilled water before adding the phosphoric acid.

* J. G. Sherrat, *Analyst*, 1937, 62, 267.

INFORMATION and ADVICE

Brining Cauliflower—Soya Bean Extraction—Salad Cream and Lemon Cheese—Potato Crisps—Mildew on Steamed Puddings—Fruit Sauce—Pickled Cucumbers

Brining Cauliflower

2,139. *We would like to know a process of brining cauliflower and of brewing vinegar.* (Sussex.)

Cauliflower in some factories is placed at once in a strong brine, 60° salometer (15·90 per cent. salt), and fermentation prevented by maintaining the brine at this concentration until the cauliflower is cured. According to Cruess, it is recommended by Le Ferre that cauliflower be cured in a 10 per cent. brine (40° salometer) and prepared for the vinegar by removing the excess salt by washing in water. For canning purposes a preliminary blanching in water containing 1 oz. citric acid per gallon is performed, followed by washing before the brining.

In the brewing of malt vinegar three distinct processes are involved:

1. Mashing, or the extraction of malt with water.
2. Fermentation, or the conversion of sugar to alcohol and carbon dioxide.
3. Acetification, or the oxidation of alcohol to acetic acid.

Each stage of the manufacture must be carefully watched. Comprehensive articles on this subject appeared in FOOD MANUFACTURE, June and July, 1932.

Soya Bean Extraction

2,140. *Can you give me any information relating to the extraction of oil from the soya bean, and of a publication on the subject? To what use can the resultant residue be put? Is it of any commercial value?* (Australia.)

Oil is extracted from the soya bean by both hydraulic and solvent extraction processes. In the former the beans are crushed to render the oil readily available under pressure, heated, and then carried to presses in which pressures of 400 to 4,000 lb. to the square inch are reached according to need. The oil exudes and is collected. The cakes are pressed again, trimmed off, and are ready for use in livestock feeding. Soya cakes contain some 5 per cent. of oil, and about 1,900 lb. is obtained from a ton of beans by this method.

The solvent process removes a greater percentage of oil. The beans are prepared as above except that they are reduced to fine flakes which are fed into vessels which, when full, are sealed and charged with solvent. The oil is removed by distillation, and the solvent may be used repeatedly. The residual soya meal contains about 1 per cent. of oil and, after drying, is ready for use by stock-feeders for cattle and poultry. Soya oil stands between linseed and cottonseed oil in characteristics. The subject is fully dealt with in *The Soya Bean*, by E. Bowdidge, Oxford University Press, 1935.

Salad Cream and Lemon Cheese

2,141. *Can you please supply us with a formula for salad cream similar to those on the market that are sold at 6d. per bottle? We should also appreciate a formula for a cheap lemon curd.* (Sunderland.)

A typical formula for salad cream is given below:

Whole egg	100 lb.
Vinegar (pale malt, 24 grain)	12 gal.
Tarragon vinegar	6 ,,
Olive oil	12 pints
Milk (unsweetened, condensed)	1½ gal.
Sugar	14 lb.
Table mustard	12 ,,
Salt	5 ,,

Place malt vinegar, sugar, and salt in steam pan. Raise to 180° F. to pass through a fine sieve. Mix the oil and mustard. Beat for 30 minutes the eggs in steam-jacketed beating machine. Add the oil and mustard, followed by vinegar, sugar, and salt solution, and also the tarragon vinegar. Turn on steam gently and heat to 175° F., continuing beating for not less than an hour. Then add condensed milk and pass through homogeniser. Fill into containers.

Lemon cheese is compounded in the following manner:

(A)	Wheat flour	7½ lb.
	Cornflour	7½ ,,
	Water	2 gal.

Soak this overnight.

(B)	White sugar	60 lb.
	Glucose	24 gal.
	Water	3 ,,

Boil (B) recipe to 245° F. and then add the following, without shutting off the steam:

White sugar	1½ lb.
Pectin	5 oz.
Dry yellow colour	⅐ ,,

Mix these ingredients well together, shake into the boiling sugar mixture through a sieve, stirring all the time. As soon as it is dissolved, add (A) recipe, to which 1 gal. of lemon juice should be added. Then add 4 lb. of butter and 6 eggs (which should be well beaten). At this stage the temperature should be about 175° to 180° F. Then in about 10 minutes gently bring the mixture to 212° F., and after about 3 to 4 minutes, bring to 218° F., and keep at this temperature for about 10 minutes.

Potato Crisps

2,142. *We are turning out a pretty good potato crisp, but would like to improve the article, if possible, by making it* (1) *a little paler,* (2) *not so oily after drying off,* (3) *ensuring a longer crispness after packing. These three items cause us trouble. Is the use of alum allowed? Do you think it will give us a dryer crisp?* (Devon.)

In reply to the three numbered queries in your enquiry:

1. A little paler crisp could be obtained by controlling the cooking at a somewhat lower heat and the time somewhat shorter.

2. To obtain a crisp that is not oily after drying off, you should experiment in the length of time allowed for draining and drying, keeping the crisps warm at the same time, so that they are packed into their bags in a warm condition.

3. Packing into bags in a warm condition should also assist in preserving crispness for a longer time. Cooking to a degree of crispness which you should be able to determine should enable you to control this property. The usual temperature of cooking is about 330° to 375° F., the length of time about 3 minutes.

POWDERED ALUM.—We cannot recommend the use of powdered alum in the washing of potato crisps. As you may know, alum was used once in baking powder and in white flour, but is now condemned for that purpose. You would therefore run the risk of its being considered an adulterant if any were detected in the crisps. There is, however, no legal ruling.

Mildew on Steamed Puddings

2,143. *I have for some time had difficulty in packing a college pudding in a transparent paper wrapper and packing in a cardboard carton to keep for reasonable periods without mildew forming on the pudding after three or four days. I would esteem it a favour if you would give me the correct procedure to prevent mildew and prolong the keeping qualities.* (Lancashire.)

We advise you to use less moisture in your mixing, because mould development is caused by the presence of excess moisture both inside and on the surface of the pudding. After steaming, you should place the pudding in a warm room so that surface moisture can dry out. The room temperature should be from 85° to 90° F. Then it could be wrapped without risk of mould developing.

If you were to bake the pudding as a cake you would have to do so in such a way that the minimum of crust were formed, but so much moisture would be lost that the pudding would never eat the same. The other procedure should overcome your trouble, but no preservatives should be added, since these are prohibited.

Fruit Sauce

2,144. *We wish to manufacture a cheap sauce, put up in a 5-oz. bottle to sell at 2d. Can you give us a formula?* (London.)

A fruit sauce of the nature you require can be made up as follows:

Dates	1½ boxes
Apple pulp	2 gal.
Tomato pulp	1 ,,
Onions	18 lb.
Salt	4 ,,
Garlic	2 ,,
Cayenne	1½ ,,
Ginger	1½ ,,
Vinegar (16 grain)	26 gal.
Acetic acid (80 per cent.)	½ ,,

Peel and chop onions and garlic. Soak ground spices in water for 48 hours. Gently simmer all for 30 minutes. Pass through a fine sieve. Bottle at over 185° F.

This formula should serve as a guide for experiment until you obtain a finished product at the price you require.

Pickled Cucumbers

2,145. *Please give us a method of brining and pickling cucumbers.* (South Africa.)

The following is an accepted method for pickling cucumbers:

Break the cucumbers in half and fill loosely into a cask, the head of which has been removed. Replace the head on the cask and fasten it down so that the cucumbers will not float. Now fill up with a light brine of 2½ lb. of salt to each gallon of water. Allow to stand for 4 to 6 days, until the cucumbers have fermented.

Then transfer them to another cask and head up. Add through the bunghole 2 oz. of benzoate of soda to each 50 gal. capacity of cask. Fill up with brine containing 3½ lb. of salt to each gallon of water.

Bung up and stand for 10 days.

Then run out the brine through the bunghole and fill the cask with water at 160° F. Stand for 24 hours.

Repeat with hot water on the two succeeding days. Then peel and slice the cucumbers.

Place the slices in a 4½ per cent. solution of acetic acid and water. Stand for 48 hours.

Fill into glass jars with the slices facing the sides. Add white mustard seeds and pale malt vinegar. Seal with cap.

Materials and Equipment Required

Enquiries have been received concerning suppliers of the following materials and equipment, and suitable recommendations have been made:

2,146. *Sodium Glutenate.* (Sheffield.)

2,147. *Gum Substitute* (*Branded*). (Lincs.)

2,148. *Nut Shelling Machine.* (Scotland.)

2,149. *Mushroom, Groats and Shredded.* (Manchester.)

2,150. *Rectangular Containers.* (Australia.)

2,151. *Literature re packing and handling fresh fish and fillets.* (Norway.)

2,152. *Information is required for modern manufacturing process and machinery for the manufacture of Living Cell Wheat Gluten.*

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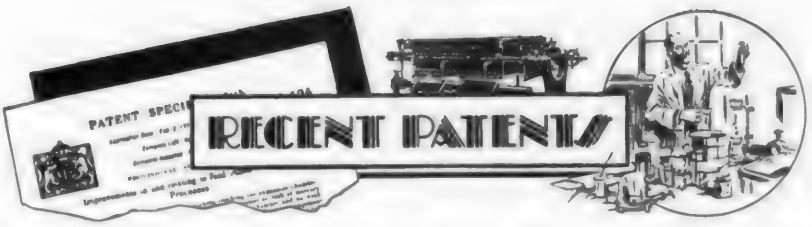

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Latest Patent Applications

11048. BROWN, E. C.: Production of cubes, etc., containing foodstuffs. April 19.
11138. ARBUTHNOT, F. S.: Treatment of fruit juices. April 19.
11187. ALUMINIUMWERKE GÖTTINGEN GES.: Crushing juices from lemons, etc. April 19.
11292. BARTON, C. N. (BENOIT): Cartons for eggs, etc. April 20.
11340. NEVE, T. A. DE: Preparation of food products from papaya fruit. April 21.
11557. HOOKE, H. F. G.: Fruit containers. April 22.
11634. LOSHAK, B.: Sorting, etc., fruit, etc. April 23.
11674. CHAMBERS, P.: Apparatus for grading fruit, etc. April 23.
12921. CALDWELL, J., EADIE, R. W.: Apparatus for making meat tender. May 6.
13008. MANTELET AND BOUCHER: Mills for grinding pepper, etc. May 6.
13156. LINNELL, W. H.: Manufacture of vitamin A. May 7.
13202. DICKSON, C. W.: Meat-tendering appliance. May 8.
13269. AKTIEBOLAGET SEPARATOR: Process and apparatus for extraction of oil from fish-liver. May 10.
13325. COX, E. T.: Extraction of natural odoriferous, etc., substances. May 10.
13453. FEDJE, I. J.: Shortening-creamer. May 11.
13479. WHITE, G. B.: Weighing butter, etc. May 13.
13591. NICHOLSON, A. O.: Preservation of perishable substances. May 14.
13655. ESCOUBÉ, G.: Packing molten cheese. May 14.
13876-7. CHAUZEIX, G.: Preparation of foodstuffs from dates. May 18.
13939. WALTERS, J., and WALTERS' PALM TOFFEE, LTD.: Manufacture of sweetmeats. May 19.
13994. DUCHSCHER, M., DUCHSCHER AND CIE: Apparatus for extraction of oil from oleaginous seeds. May 18.
14372. NIRO ATOMIZER AKTIESELSKAB, NYROP, J. E.: Method of producing milk powder. May 24.
14526. MACFEETERS, J. A.: Honey and butter product. May 25.

Complete Specifications Accepted

465,111. EKHARD, DR. W.: Process for the improvement of oils, fats, and the like.
465,153. VOSS, H., FROMM, R., and MAU, J. (trading as Lehmann and Voss and Co.): Treating lecithin and product. (Cognate application 29673/35.)
465,242. PEEK, FREAN AND CO., LTD., and RONDOLIN, L.: Edible wafer products.
465,252. WEBB, W. B., and HOUGHTON, J. G.: Means for shelling peas.
465,423. WILLMAN, J.: Treating cream.
465,547. KAWAI, K.: Method of manufacturing oil-containing vitamins. (February 27, 1936.)
465,852. MARAKAS, J. G.: Method of and apparatus for the industrial production of pure crystalline natural grape-sugar (glucose, dextrose) from grapes or raisins. (Cognate applications 17318/36 and 17319/36.)
465,884. CHRISTENSEN, C. H.: Process of preparing food products from barley, soya beans, maize, and ground nuts.
466,003. AUBAN, F. P. M.: Packing of coffee and like materials. (October 7, 1935.)
466,142. HADDAN, R. (WESTERN STATES MACHINE CO.): Process of refining sugar.
466,158. AUTOXYGEN, INC.: Preservation of food substances. (August 1, 1934.)
466,356. HIRSCH, DR. P.: Production of pectin.
466,484. HILL ENGINEERING CO. (HULL), LTD., T., HILL, T. E., and HARRISON, N. C.: Cleaning of bottles, jars, or like containers.

Printed copies of the full Published Specifications may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, at the uniform price of 1s. each.

Abstracts of Recent Specifications

Group Abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, either sheet by sheet as issued on payment of a subscription of 5s. per Group Volume, or in bound volumes price 2s. each.

460,097. GROUP XIII. **Freezing fish, meat, etc.** WOOD, H. J., and HUME, E. GORDON-.
Comestibles such as fish, meat, and vegetables are preferably dipped in weak brine or other solution and wrapped in paper or cellulose covering before freezing, which is effected in a closed chamber 5 by chilled air circulated in a counter flow, the chamber being surrounded by a jacket 6 for chilled brine. The chamber is preferably of circular or oval cross-section and may be circular in plan, and contains an endless chain conveyer 19, Fig. 4, having transverse angle bars 21 provided with bow springs 24 to grip the sides of openwork carriers 9 for the material to be frozen. Loading and discharge platforms 10 are located opposite counterbalanced doors 12. The walls of the chamber and jacket may be in upper and lower halves with jointing flanges 7, and may be in connected longitudinal sections. The brine for the jackets and the air for the chamber are cooled in a tank 30, Fig. 1, fitted with evaporator coils 31 of a refrigerating machine, including compressor 33 and condenser 34. The air outlet 16 of the chamber is preferably formed as a funnel

FIG. 1.

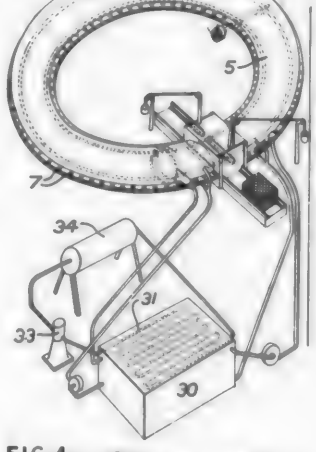
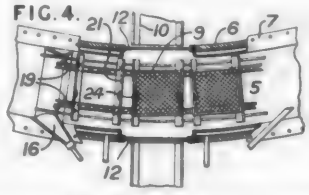


FIG. 4.



to prevent flow past the loading opening. After the material is discharged it may be glazed by coating it with fresh water.
461,269. **Hydrogen peroxide leavened bakery products.** DU PONT DE NEMOURS AND CO., E. I., Wilmington, Delaware, U.S.A.
When using a leavening agent consisting of hydrogen peroxide or other suitable peroxide compound, and allowing the dough or batter to proof for a suitable time before baking, it has been found desirable to introduce a trace of substance capable of inhibiting the catalases present (in order to control the rate of decomposition of hydrogen peroxide). Typical examples of such inhibitors are maleic acid, sodium perchlorate, pyrogallol, allyl alcohol, calcium acid phosphate, and benzyl amine, all of which are harmless in the quantities needed to inhibit catalase activity, although some may be objectionable on the ground of flavour. They do not appear to function by modifying the *p*H of the batter or dough.

Calcium acid phosphate was used as inhibitor in a white cake in the proportion of 0·16 per cent., the other ingredients being: Sugar 121 gm., salt 2 gm., hydrogenated oil shortening 52 gm., flour 136 gm., vanilla extract 2 c.c., egg whites 61 gm., milk powder 12½ gm., water 88 c.c., starch 15 gm., 100-vol. hydrogen peroxide solution 4·2 c.c. Shortening, sugar, salt, and about one-tenth of the flour were creamed until light, when the egg whites were added and the mixture

again creamed. A homogeneous solution was prepared from the milk powder and calcium acid phosphate, while the starch was added to the remainder of the flour. The solutions containing milk powder-calcium acid phosphate and flour were then stirred alternately in small portions into the mixture. The hydrogen peroxide was added to the last portion of milk powder and water. The batter was allowed to stand and periodically tested for free hydrogen peroxide by adding potassium iodide solution (absence indicated when a blue or brown colour no longer developed). A negative reaction was obtained after 80 minutes, and the cake was then baked at 375° F. (Convention date, U.S.A., August 14, 1934.)

461,343. **Extracting fish-oils.** HOPKINSON, L. T.

Uncrushed fish material (including material from marine animals) in the form of whole fish or fragments of appreciable size is treated with formaldehyde or acetaldehyde to fix partially the solid constituents of the material and to release partially the liquids therefrom, the treated material is heated to fix further the solid constituents and release further the liquids, and then the liquids are expressed from the material and the oil is separated from the liquids. The aldehydes may be used in the form of their aqueous solutions. The material may be rendered neutral or slightly acid, for example, by the addition of sulphuric, hydrochloric, or nitric acid before the addition of the aldehyde. The process may be conducted in the apparatus set forth in Specification 461,411. Specification 218,680 (Class 91) also is referred to.

461,615. **Margarine.** SCHOU, H.

In the manufacture of margarine the final product is given a viscosity of at least 36 centipoises at 50° C., and at least 15 per cent. higher than that of the original oil-fat mixture in the just molten condition by sufficiently finely distributing the aqueous phase in the oil-fat phase, an oil-soluble water-dispersing stabiliser being added to the oil-fat mixture. The desired dispersion of the aqueous phase may be obtained by emulsification, which is continued until the desired value is attained, or where the dispersion is effected in a single operation—*e.g.*, by atomisers—by determining the conditions of the operation by test. The aqueous phase may consist of an oil in water emulsion, using which the desired viscosity is obtained with a less fine dispersion than required for water. In an example, in 85 kg. of a mixture of 65 per cent. cocoa-fat, 25 per cent. hard fat, and 10 per cent. of cotton-seed, soya, arachis, or equivalent vegetable oil, 500 gm. of a stabiliser are dissolved, and 16 kg. of water or milk are atomised therein to give a viscosity of 36 to 60 centipoises at 50° C. The mixture is cooled and ripened, left till the mass has an even temperature, and rolled between stone rollers at 12° to 16° C. In a modification, 14 kg. of vegetable oil are finely distributed as a homogeneous emulsion in 16 kg. of skimmed milk, and the emulsion is atomised in 70 kg. of fat mixture containing 500 gm. of stabiliser and worked up as in the first example. In a further example an emulsifying agent—*e.g.*, one prepared as described in Specification 187,298 (Class 84)—is added to the molten oils and fats, and about 16 per cent. of water or milk are distributed therein through an atomiser with an aperture of 0·1 mm. at a pressure of 250 to 300 atmos., or the water or milk may be added to the oil-fat mixture and the stabiliser and the mixture circulated by a rotary pump until a viscosity of 36 centipoises is produced.

462,897. **Regeneration of bakery products.** LYONS AND CO., LTD., J., and COHEN, V. L., Cadby Hall, London, W. 14.

Rolls and like starch-containing bakery products that have staled largely owing to localisation of their moisture at the surface following exposure to the atmosphere are restored to their original freshness by subjection to the action of freely circulating heated air at an even-controlled critical temperature for about eight to ten minutes. The critical temperature will vary with the class of baking goods, but will be of the order of 250° F. It is advisable to support the goods on wire trays or shelves so that they make minimum contact with each other or the support. Applicants' specification No. 462,389 describes a suitable oven for this purpose.

462,986. **Diabetic bakery goods.** SAGI, DR. J., Mihaly utca 11, Budapest, Hungary.

To improve the palatability and digestibility of batters and other bakery products on the basis of whisked or frothed egg in which the egg content has been reduced below a certain limit (to render the albumen content sufficiently low for diabetics), it is proposed to incorporate a high proportion of water-soluble gum such as arabic. The latter increases the stability of the egg whisk or froth, which is also rendered capable of absorbing twice as much foreign ingredients without sacrifice of taste and porosity. It is also proposed to replace ordinary flour by one free from or poor in carbohydrates. *Examples:* (1) To the whisked whites of four eggs are added a frothed mixture of 200 gm. of a 50 per cent. aqueous solution of gum arabic and the four egg yolks. Whisk and froth are then blended and incorporated with 100 gm. of glutinous flour, suitable quantities of salt and other normal ingredients, and baked to biscuits or cakes. (2) To prepare a "Madeira cake batter", 90 gm. of a 30 per cent. aqueous solution of gum arabic are added to a warm-frothed mixture of two whole eggs and four egg yolks. A paste for baking is then prepared by the addition of 50 gm. flour (from wheat or other cereal germ), 30 gm. sorbitol, 4 gm. baking powder, and 60 gm. butter.

463,060. **Cereal-drying plant.** ROWLES, A. D., and BARRON AND SON, LTD., Ladybellgate Street, Gloucester.

Materials of the nature of cereals or tea are dried and conditioned in the plant illustrated by means of hot air, which medium is also used for conveying the material through the plant. The latter is of the type employing one or more upright conduits, each comprising a series of trunks joined by constricted necks.

463,403. **Preservation of eggs.** DOYLE, DR. J. D., and DOYLE, M. K., St. Dominic's, 30, Sycamore Road, Mt. Merrion Park, Blackrock, Co. Dublin.

The method claimed makes use of an electric current, alternating, direct, or intermittent, to destroy the fertility of the eggs and of a sealing compound to close the pores of the eggs. As soon as possible after laying, the eggs are assembled in an electrically conductive tray, which is connected to one terminal of a source of current. The other terminal is connected to a suitable brush or the like, which is passed over the eggs. If provided with an insulating handle, the brush can be operated by hand. The usual circuit of 220 volts and 50 cycles A.C. immediately destroys the fertility of the eggs and any bacteria capable of starting decomposition. The subsequently applied (by dipping) sealing composition is prepared from 1 part celluloid in 7 parts of an equal volume of acetone and amyl acetate and 1 part creosote oil (or other suitable germicide).

Compared with X-ray and ultra-violet ray treatment, the method claimed has the advantage of not destroying the vitamin value.

464,021. **Edible jellies.** SCOTT, R., 10, Greystoke Court, Hanger Hill, Ealing, London, W. 5.

Sugar incorporated with a flavour and an edible acid and broken up or tableted is contained in a vapour-proof main package, while pectin with a proportion of buffering salts is present in a subsidiary package. Alternatively, the edible acid may be kept segregated in a small package until the jelly is made. For this purpose a solution of the pectin is first prepared with hot water, and the flavoured and acidified sugar is stirred in with more heating. The edible acid must be present in quantity required to give the optimum hydrogen-ion concentration in the final jelly. The main package may contain, for example, 200 gm. flavoured sugar crystals and 2·08 gm. tartaric acid. Within this package is a vapour-proof package containing 5·2 gm. dry pectin (100 grade), 0·62 gm. Rochelle salt, and 5 gm. sugar.

464,694. **Preservation of foodstuffs by freezing.** HECKERMANN, H., 55, Georgstrasse, Bremen.

It is proposed to freeze fish, fruit, and vegetables by spreading them out in the natural condition with the minimum supporting surface and to freeze them suddenly by applying an air current at a temperature not exceeding −15° C. and then storing the frozen goods at a temperature of −5° C. or below with constant air circulation (as described, for instance, in 425,346). Exposure to the cold air current is continued until the goods are frozen right through.

To maintain the high relative humidity of the goods (85 to 95 per cent.) proved essential to the retention of freshness in appearance and flavour, measures are taken to reduce the temperature difference between the air in the chamber and the cooling surfaces to not more than 6° C. In this way the quantity of water vapour normally condensed by freezing is substantially reduced. This is effected by increasing (doubling) the surface of the cooling pipes and using part of the cooling surface to support the stored goods. The larger cooling surfaces are, incidentally, more economical in operation, as the cold can be produced at higher temperatures.

NEW COMPANIES

Baron's Snacky Fingers, Limited. (327,892.) To take over the bus. of mnfg. confectioners cd. on at 23, Gorton Street, Blackpool, as "Baron, Walton and Rostron". Nom. Cap.: £3,000. Permt. dirs.: R. Baron, 23, Gorton Street, Blackpool; W. J. Rostron, 22, Westcliffe Drive, Blackpool; Miss M. Walton, 11, Edleston Road, Blackpool.

John Berridge, Limited. (327,563.) 12, Potato Market, Somers Town Goods Station, Euston Road, N.W. 1. To take over the bus. of agricultural produce mchts. cd. on at Covent Garden and Somers Town, London, as "Berridge Brothers". Nom. Cap.: £7,500 in £1 shares. Permt. dirs.: A. J. Berridge and Ethel D. Berridge, of Bydews, Tovil, Maidstone; J. L. Edwards, Wingfield, Yarmouth Road, North Walsham, Norfolk.

Cane Stores, Limited. (327,486.) 304, Roman Road, E. 3. To carry on the bus. of grocers, general storekeepers, etc. Nom. Cap.: £2,000 in £1 shares. Dirs.: B. Cohen and D. Cohen, both of 4, Dunsmure Road, N. 16.

Claybrook Health Company, Limited. (327,924.) Allen House, Newark Street, Leicester. To carry on the bus. of a café and restaurant, etc. Nom. Cap.: £5,100. Dirs.: F. H. C. Brook, 9, Little Forest Mansions, Bath Road, Bournemouth; Miss F. Clay, 9, Little Forest Mansions, Bath Road, Bournemouth.

Continental Milk Bars, Limited. (328,134.) 11, Waterloo Place, Pall Mall, S.W. 1. To carry on the bus. of sellers of milk and other beverages, etc. Nom. Cap.: £5,000. Dirs.: Hon. H. D. McIntosh, W. R. Sharp, and T. M. Macquaker.

Excel Fisheries, Limited. (328,004.) Oswaldestre House, Norfolk Street, Strand, W.C. 2. To carry on the bus. of proprietors of multiple shops, retailers of fish, etc. Nom. Cap.: £6,300.

Faulkes Stores, Limited. (328,162.) 1893, Pershore Road, Cotteridge, King's Norton, Birmingham. To carry on the bus. of grocers, bakers, confectioners, etc. Nom. Cap.: £2,000. Dirs.: W. H. Faulkes, 347, Franklin Road, King's Norton, Birmingham (permt.); Mrs. A. M. Faulkes, 347, Franklin Road, King's Norton, Birmingham.

Foulds (Golborne), Limited. (327,738.) To take over the bus. of a wholesale pork butcher cd. on by J. Foulds at 91, High Street, Golborne, Lancs. Nom. Cap.: £2,000.

Franklin and Cook, Limited. (327,534.) To carry on the bus. of mnfrs. of and dlrs. in yeast and by-products, etc. Nom. Cap.: £6,000.

Harold Hicks, Limited. (327,976.) To carry on bus. as hay, straw, and chaff mchts., corn and grain factors, etc. Nom. Cap.: £4,000. Dirs.: H. Hicks, 71, Lightwoods Hill, Warley, Birmingham; H. S. Hicks, 71, Lightwoods Hill, Warley, Birmingham.

Hereward Hotel, Limited. (327,938.) 2, Gordon Road, Cliftonville, Margate. To take over the bus. of a hotel proprietor cd. on at Margate, etc. Nom. Cap.: £6,000. Permt. gov. dir.: E. Thompson, 266, Hale Lane, Edgware, Middlesex.

L. Hutton and Company (Windermere), Limited. (327,509.) To carry on the bus. of mnfrs. of and dlrs. in confectionery, etc. Nom. Cap.: £3,000 in £1 shares. Dirs.: A. F. Whittle, Bleak House, Windermere; Ada Whittle, Underwood, Manor Park, Keswick; Lucy A. Hutton, 20, Station Road, Keswick; Mrs. W. S. Whittle, Bleak House, Windermere.

Idris Evans, Limited. (327,457.) To carry on the bus. of bakers, etc. Nom. Cap.: £5,000 in £1 shares (1,000 pref. and 4,000 ord.).

A. W. Kirkebye, Limited. (327,962.) To take over the bus. of fruit and produce mchts., etc., cd. on by A. W. Kirkebye at Hull and elsewhere. Nom. Cap.: £6,000. Dirs.: A. W. Kirkebye, 40, Bernstorffsgade, Copenhagen; K. H. Wulff, 239, Chanterlands Avenue, Hull; A. Schottmann, 66, Tietgensgade, Copenhagen.

Leicester Egg Depôt, Limited. (327,511.) To take over the bus. of an egg and provision mcht. cd. on by J. A. Ross at Clarence Street, Leicester. Nom. Cap.: £5,000 in £1 shares. Dirs.: J. A. Ross, 9, Ambassador Road, Leicester, and L. A. Rodwell, 63, Montague Road, Leicester.

Mandeville Hotel, Limited. (327,418.) Mandeville Hotel, Mandeville Place, Wigmore Street, W. 1. To carry on the bus. of hotel, restaurant, and lodging-house keepers, etc. Nom. Cap.: £5,000 in £1 shares. Dirs.: J. M. McKenna and Gladys M. McKenna, of 8, South Croxted Road, Dulwich, S.E.; J. S. Stooke-Vaughan, 12, John Street, Bedford Row, W.C. 1.

Marine Hotel (Blackpool), Limited. (327,986.) To carry on the bus. of hotelkeepers, etc. Nom. Cap.: £2,000.

Matthews of Exeter, Limited. (327,713.) To take over the bus. of grocers and provision mchts., etc., cd. on at 49, Sidwell Street, and 51, Alphington Street, Exeter, as "Matthews of Exeter". Nom. Cap.: £5,000.

Midland Grassdrying Company, Limited. (327,314.) To manufacture and deal in corn, straw, fodder, and other vegetable products, etc. Nom. Cap.: £3,000. Dirs.: H. Brown, Sywell House, Northampton; C. M. Newton, Bridge Street Chambers, Northampton; Major G. R. D. Shaw, Whilton Lodge, Long Buckly, Rugby; S. P. Tyzack, Plum Park, Towcester.

Norths' Box Mills, Limited. (327,516.) Sitwell Street, Hull. To take over the bus. of box, packing case, and fish kit mnfrs. cd. on by W. W. North, Ltd., at Hull. Nom. Cap.: £50,000 in £1 shares. Permt. dirs.: W. W. R. North, Alston, Springhead Park, Witherby, E. Yorks, and L. A. North, Great Hatfield, Hull.

Norwich Grain Company, Limited. (326,898.) 30, Cattle Market Street, Norwich. To carry on the bus. of corn, grain and seed merchants, maltsters, etc. Nom. Cap.: £10,000 in £1 shares. Dirs.: E. J. Beckett, Woodside, Taverham, Norfolk; S. F. Yates, 10, Somerleyton Street, Norfolk.

W. P. Orme and Sons, Limited. (327,675.) Hartshorne, near Burton-on-Trent. To take over the bus. of a grocer, provision mcht., baker, etc., cd. on at Derby and elsewhere as "W. P. Orme". Nom. Cap.: £5,000. Dirs.: W. P. Orme, Hartshorne, near Burton-on-Trent (permt. gov. dir.); J. Orme, Hartshorne, near Burton-on-Trent; W. I. Orme, Hartshorne, near Burton-on-Trent.

Polzeath Lodge Hotel, Limited. (327,421.) Polzeath Lodge Hotel, Polzeath, Cornwall. To take over the bus. of a hotel proprietor cd. on by H. W. Jones at Polzeath. Nom. Cap.: £4,000 in £1 shares. Dirs.: W. D. W. Ross, 27, Hayne Road, Beckenham, Kent; W. H. King, 55, Cedars Road, Beckenham, Kent; H. W. Jones, Polzeath Lodge, Polzeath.

Portuguese Sardine Association (U.K.), Limited. (326,791.) 20, Regent Street, W. 1. To promote and protect the interests of the sardine trade in the U.K., etc. Committee: N. Brooks, Highways Chelmsford Road, Shenfield; S. A. Cohen, The Grange, 5, Lawn Road, Beckenham; F. R. Webb, San Martin, Meadowview Road, West Ewell; C. E. Punter, 47, Queen Anne's Grove, Ealing, W.; C. G. Williams, 4, Blakeney Road, Beckenham; and three others.

G. Pratt (Butchers), Limited. (328,163.) To carry on the bus. of butchers, etc. Nom. Cap.: £2,000. Dirs.: G. Pratt, Hursley Road, Chandlersford (permt.); Mabel D. Pratt, Hursley Road, Chandlersford; Pamela J. Pratt, Hursley Road, Chandlersford.

Purity Milk Bars, Limited. (327,756.) To carry on the bus. of purveyors of milk and milk drinks, etc. Nom. Cap.: £3,000. Dirs.: B. L. Hipwell, 181, Monyhull Hall Road, King's Norton, Birmingham; Miss A. Speke, Treluck Grange, Chepstow.

Puroh Bakeries, Limited. (327,719.) 2, Eldon Square, Newcastle-on-Tyne. To take over the bus. of bakers and confectioners cd. on by the Newcastle Model Milk Co., Ltd., at Newcastle-on-Tyne. Nom. Cap.: £2,000.

Quarton's (Scunthorpe), Limited. (327,949.) To take over the bus. of fruit, vegetable, and flower dlr. cd. on by C. F. B. Quarton at Parkinson Avenue and 191-3, High Street, Scunthorpe. Nom. Cap.: £1,000. Permt. dirs.: C. F. B. Quarton, 2, St. Nicholas Street, Scarborough (ch.); C. A. Shipley, Parkinson Avenue, Scunthorpe; O. P. C. Sutcliffe, Edenhurst, Exeter Road, Scunthorpe.

Raleigh Hotels, Limited. (327,829.) To carry on the bus. of hotel proprs., etc. Nom. Cap.: £2,000.

Rhine Wines (Walter S. Siegel), Limited. (327,619.) 30, South Audley Street, W. 1. To carry on the bus. of wine, spirit, and beer mchts., etc. Nom. Cap.: £5,000 in 4,900 ord. shares of £1 and 2,000 founders' of 1s.

Southern Bungalow Hotel, Limited. (327,824.) The Southern Bungalow Hotel, Cromer, Norfolk. To take over the bus. of a hotel propr. cd. on by Ruth G. Hooper at Cromer. Nom. Cap.: £2,000. Dirs.: Una R. Hooper, The Southern

Bungalow Hotel, Cromer; Kathleen C. Lewis, Strafford House, Swacking Cuckoo, Holt Road, Cromer.

J. V. Stephenson and Sons, Limited. (327,784.) To take over (1) the bus. of mnfg. confectioners' sundriesmen and dry-salters cd. on as "J. V. Stephenson and Sons" at 8-10, Dutton Street, Cheetham, Manchester, and (2) the bus. of a mnfg. confectioners' agent and factor cd. on at 23, Broadway, Walkden, near Manchester, by H. Bate. Nom. Cap.: £5,000. Dirs.: W. Stephenson, 6, Cranbrook Drive, Sedgeley Park, Manchester; J. G. Stephenson, 12, Salisbury Drive, Sedgeley Park, Manchester; H. Bate, 23, Broadway, Walkden, near Manchester.

E. M. Stokes and Sons, Limited. (327,647.) Law Association Buildings, 15, Harrington Street, Liverpool, 2. To take over the bus. of retail butchers cd. on at Liverpool as "Stokes and Sons". Nom. Cap.: £2,000. Dirs.: Elizabeth M. Stokes, 20, Gardner Road, Liverpool, 13; A. Stokes, 20, Gardner Road, Liverpool, 13; A. S. Lancelot, 20, Gardner Road, Liverpool, 13.

Twy Gardens, Limited. (327,954.) To carry on the bus. of nurserymen, farmers, fruit-growers, etc. Nom. Cap.: £2,500 in £1 shares. Dirs.: Marjorie Turner, The Oaks, Connaught Avenue, Frinton-on-Sea; S. C. Turner, The Oaks, Connaught Avenue, Frinton-on-Sea.

H. Tyson, Limited. (326,888.) 24, Humber Street, Hull. To carry on the bus. of dlrs. in fruit and vegetables, etc. Nom. Cap.: £2,000 in £1 shares. Dirs.: H. Tyson, Goxhill, Lincs. (permt.); J. van den Bos, Goxhill, Lincs.

Unicorn Milling Company, Limited. (327,764.) To carry on the bus. of millers, corn mchts., etc. Nom. Cap.: £8,000. Dirs.: C. P. Gibbons, Sunnymede, 24, Avon Road, Keynsham, Som.; M. F. Gibbons, 21, St. Keyna Road, Keynsham.

H. Warrington, Limited. (327,809.) 119, Buxton Road, Stockport. To carry on the bus. of butchers, etc. Nom. Cap.: £2,000. Dirs.: H. Warrington, 119, Buxton Road, Stockport (permt. gov. dir.); H. Warrington, Sr., 119, Buxton Road, Stockport; Mrs. E. Warrington, 119, Buxton Road, Stockport.

West Indies Sugar Company, Limited. (328,084.) 21, Mincing Lane, E.C. To carry on the bus. of mnfrs. and refiners of and dlrs. in sugar and by-products thereof, etc. Nom. Cap.: £600,000.

Weydale Hotel, Limited. (328,237.) Weydale Hotel, Weydale Avenue, Scarborough. To carry on the bus. of proprietors of hotels, etc. Nom.Cap.: £4,000. Dirs.: C. W. Haynes, 27, Cleveland Avenue, Scarborough; F. Redpath, 31, Britannia Street, Scarborough.

Woodland Bakery, Limited. (327,380.) To take over the bus. of a baker and confectioner cd. on by H. Dunning at 250, Gt. North Road, Woodlands, Doncaster. Nom. Cap.: £3,000. Permt. dirs.: H. Dunning, York House, Woodlands, Doncaster (ch.); C. E. Whitley, Doon Garth, 10, Franklin Mount, Harrogate.

The above-mentioned particulars of new companies recently registered have been extracted from the daily register of Messrs. Jordan and Sons, Ltd., company registration agents, Chancery Lane, W.C. 2.

LATEST TRADE MARKS

This list of Trade Marks of interest to readers has been selected from the "Official Trade Marks Journal", and is published by permission of the Controller of H.M. Stationery Office. The "Trade Marks Journal" can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

ANITA. — 573,515. **Sardines.** EMPREZA INDUSTRIAL DE CONSERVAS POKER, LIMITADA, 11, rua Nova do Almada, Lisbon, Portugal. (Associated.) May 26.

CERETA.—574,536. **Cereals and cereal products (for food).** QUAKER OATS, LTD., Bridge Road, Southall, Middlesex. (Associated.) June 9.

CONGRESS. — 575,905. **Margarine, lard (for food), and compounds (consisting of mixtures of oils and fats) for use as food as substitutes for lard.** WESTERN MARGARINE, LTD., Alliance Factory, Western Avenue, Acton, London, W. 3. June 9.

GINGYBREW.—574,222. **A preparation for making ginger beer.** BARNETT AND FOSTER, LTD., Niagara Works, Eagle Wharf Road, London, N. 1. (Associated.) June 2.

GOLDEN BARQUE. — 576,616. **Cheese, butter, condensed milk, fresh cream, and sterilised cream.** DAWS' CREAMERIES (SALTASH), LTD., New Road, Saltash, Cornwall. June 2.

GOOD LUCK.—574,574. **Canned fish.**

J. H. MEACHIN AND CO., LTD., Raven Flour Mills, 289, Stockport Road, Longsight, Manchester, 13. (Associated. May 26.

Registration of this trade mark shall give no right to the exclusive use, either separately or in combination, of the words "My Favourite" and the device of a fish.

HERALD. — 575,151. **Machine skimmed condensed milk.**

N.V. FABRIEK VAN MELKPRODUCTEN, "Nieuw-Holland," 14, Utrechtsche Straatweg, Woerden, Holland.

Registration No. 310,680 (1628) will be cancelled if and before the applicants' mark is registered.

LINGFOMILK. — 576,694. **Milk powder and preparations in powder form containing milk powder for use as ingredients in food.** JOSEPH LINGFORD AND SON, LTD., 5, Durham Street, Bishop Auckland, Durham. June 9.

MORPHEUS.—576,463. **Coffee.** NORMAN MAURICE PRINCE, 93, Oakwood Court, Kensington, London, W. 14. May 26.

MOULIPEPPER. — 576,749. **Pepper.** MOULIWARE, LTD., 20 and 22, Hatcham Road, Canterbury Road, London, S.E. 15. June 2.

OAGOA.—575,002. **Tea and cereals (for food).**

FRED CHARLES TOWERS and JOHN THORNTON TOWERS, trading as O'Neill and McHenry, 2-3, Guildhall Street, Londonderry, Northern Ireland. June 9.

SERVA.—574,670. **Bread and biscuits.**

KAVLI, LTD., 53, Nelson Avenue, Nelson Village, Cramlington, Northumberland. (Associated.) June 9. (By Consent.)

Registration of this trade mark shall give no right to the exclusive use of the word "Serva".

SILVER HOOK.—574,656. **Butter, margarine, and cheese.** HAROLD GUY HOOKER and PETER DE FLORIN, trading as Florin and Hooker, Leighcliff Building, Leighcliff Road, Leigh-on-Sea, Essex. (By Consent.) May 19.

SUNERA.—576,781. **Meal, being food for human use.** WILLIAM HAMILTON WHITE and ALEXANDER PHILLIPS HILL, trading as White and Hill, Whitehall Buildings, 13, Ann Street, Belfast, Northern Ireland. June 2.

568,503.—**All goods in Class 42, which includes substances used as food or as ingredients in food.** JOHN ERIC HORNIMAN, Mount Royal, Marble Arch, London, W. 1. May 19.

570,308.—**Canned, bottled, and preserved peas.** WM. P. HARTLEY, LTD., 3, Hartley Avenue, Aintree, Liverpool, and 8, Green Walk, Tower Bridge Road, London, S.E. 1 (Associated.) June 9.

Registration of this trade mark shall give no right to the exclusive use either separately or in combination of the device of peas and the word "Hartley's".

B 572,934. — **Bacon.** WARREN AND REYNOLDS, LTD., 115 to 121, Tooley Street, London, S.E. 1. June 9.

User claimed from April 1, 1894.

The applicants undertake that this mark, when registered, and the mark No. B 572,935 (3089), shall be assigned or transmitted only as a whole and not separately.

Registration Nos. 408,857 (2254) and B 435,208 (2358) will be cancelled if and before the applicants' mark is registered.

B 573,323.—**Tapioca for food.** N.A. HANDELSVEREENIGING "AMSTERDAM," Nieuwe Zyds Voorburgwal 162, Amsterdam, Holland. June 2.

User claimed from July 5, 1934.

576,197.—**Substances used as food or as ingredients in food.** WESTERN MARGARINE, LTD., Alliance Factory, Western Avenue, Acton, London, W. 3. (By Consent.) June 2.